# PART I

# HUMAN ECOLOGY AND FAMILY SCIENCES

## Textbook for Class XII

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**12136 – Human Ecology and Family Sciences Part I**
Textbook for Class XII

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# Foreword

The *National Curriculum Framework* (NCF) 2005 recommends that children's life at school must be linked to their life outside the school. This principle marks a departure from the legacy of bookish learning which continues to shape our system and creates a gap between the school, home and community. The syllabi and textbooks developed on the basis of NCF signify an attempt to implement this basic idea. They also attempt to discourage rote learning and the maintenance of sharp boundaries between different subject areas. We hope these measures will take us significantly further in the direction of a child-centred system of education outlined in the National Policy on Education (1986).

This initiative can succeed only if all stakeholders–school principals, parents and teachers–encourage children to reflect on their own learning and to pursue imaginative activities and questions. We must recognise that, given space, time and freedom, children generate new knowledge by engaging with the information passed on to them by adults. We also must remember that a prescribed textbook is only one of the learning resources for a child, and the teacher another. Her/his home and her/his environment, her/his life and her/his peers, all these are resources and sites of learning. Inculcating creativity and initiative is possible if we perceive and treat children as the chief agents of their learning, not as receivers of a fixed body of knowledge. These beliefs imply a considerable change in school routines and mode of functioning.

The book in your hands at present is an example of how a textbook can be. It is based on NCERT's resolve to reconstruct knowledge in all areas from the perspective of the learner and the dynamic socio-economic realities of contemporary India. The National Focus Group on Gender Issues in Education, appointed under the auspices of NCF-2005, emphasises the urgency of incorporating women's perspective for epistemologically redefining conventionally defined subjects like home science. We hope that the present textbook will make this subject free of gender bias and capable of challenging young minds and teachers for creative study and practical work.

NCERT appreciates the hard work done by the Textbook Development Committee responsible for this book. We are especially grateful to the members of the National Monitoring Committee, appointed by the Department of Secondary and Higher Education, Ministry of Human Resource Development, for their valuable time and contribution and the sub-committee (National Review Committee) for Human Ecology and Family Sciences (HEFS) for their contribution in reviewing the textbook.

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As an organisation committed to systemic reform and continuous improvement in the quality of its products towards quality learning for all, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement.

H.K. SENAPATY
*Director*
National Council of Educational
Research and Training

New Delhi
*February 2016*

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# Rationalisation of Content in the Textbooks

In view of the COVID-19 pandemic, it is imperative to reduce content load on students. The National Education Policy 2020, also emphasises reducing the content load and providing opportunities for experiential learning with creative mindset. In this background, the NCERT has undertaken the exercise to rationalise the textbooks across all classes. Learning Outcomes already developed by the NCERT across classes have been taken into consideration in this exercise.

**Contents of the textbooks have been rationalised in view of the following:**

- Overlapping with similar content included in other subject areas in the same class
- Similar content included in the lower or higher class in the same subject
- Difficulty level
- Content, which is easily accessible to students without much interventions from teachers and can be learned by children through self-learning or peer-learning
- Content, which is irrelevant in the present context

**This present edition, is a reformatted version after carrying out the changes given above.**

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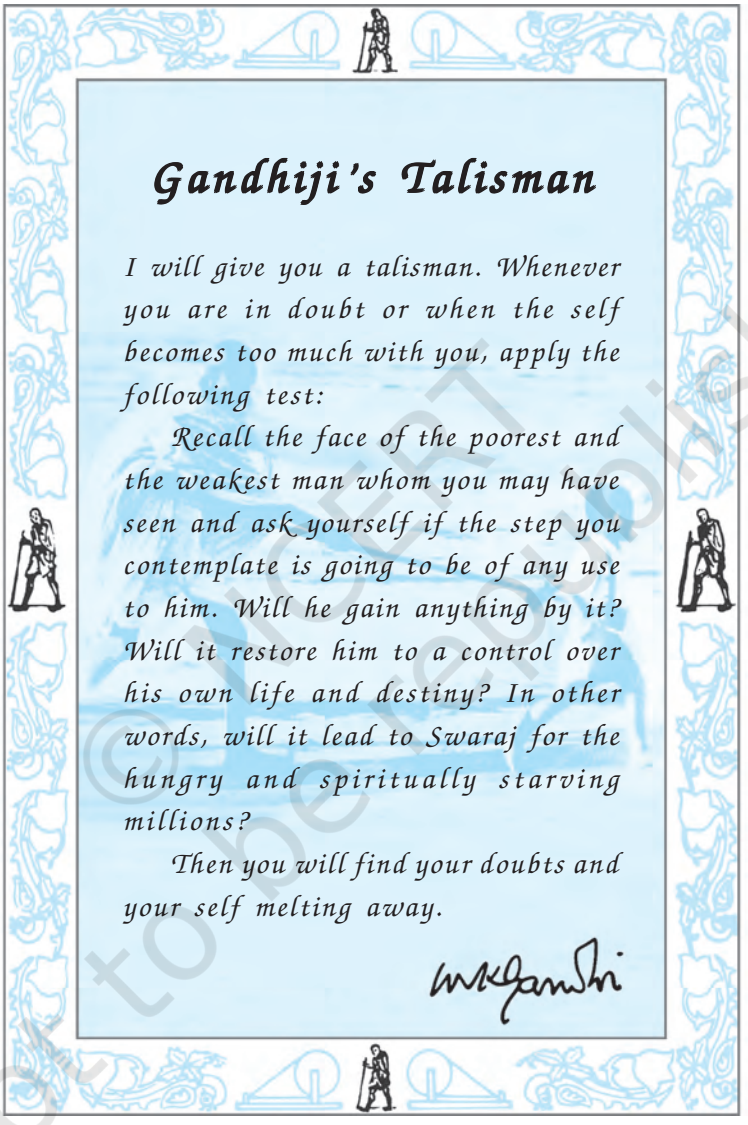

# Gandhiji's Talisman

*I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:*

*Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?*

*Then you will find your doubts and your self melting away.*

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# Preface

The textbooks on Human Ecology and Family Sciences (HEFS), hitherto known as 'Home Science', have been developed based on the vision and principles of the *National Curriculum Framework* – 2005 of the NCERT. Globally, the field of Home Science is known by newer nomenclatures but encompasses basically five domains, namely, Food and Nutrition, Human Development and Family Studies, Fabric and Apparel, Resource Management, and Communication and Extension. Each of these domains or specialisations (as referred to in various colleges and Universities) have grown and matured with expanding horizons, keeping in tune with the changing needs of individuals, families, industry and society. Consequently these domains have developed newer thrusts in view of the evolving job market, and in many Universities have been renamed to represent their current status and scope in a better way.

All these domains have their specific content and focus that contribute to the Quality of Life (QoL) of individuals, families and communities in the global, socio-cultural and socio-economic contexts. Every person is entitled to a good QoL, and this creates a demand for professionals who can positively contribute to different arenas and needs of personal and social life – ranging from basic sanitation, housing, health care for physical and mental well-being, safety, environmental promotion and protection, clothing, finance and a host of myriad allied aspects of living, from micro to macro levels. This obviously creates a challenge for educationists and educational institutions to train persons to deliver the multifarious services. In this context, HEFS provides numerous avenues with interdisciplinary perspectives. These include opportunities to work in industry/corporate sector, teaching at various levels, research and development, various cadres in public sector, regional, national and international organisations that work with and for communities as well as entrepreneurial ventures.

The academic fraternity, professionals working for community development and those from industry are constantly interacting and shaping the education and training in these fields. Thus educational programmes offered under HEFS (Home Science/ Family and Community Sciences) are geared up towards development of professionals who not only have knowledge and skills, but are also sensitised to the challenges, needs and concerns related to quality of life, productivity and sustainable development.

This textbook takes a holistic approach to address the pertinent issues related to work, employment and careers, keeping quality of life in perspective, individually and collectively. Hence the first unit and chapter is focussed on life skills for livelihood, attitudes to work, work challenges, creativity, performance and productivity, social responsibility and volunteerism. The importance of flexibility, diversity, adaptation, balance between work, rest and recreation, enhanced job satisfaction, and importance of occupational health and safety are dwelt upon. Entrepreneurship versus employment is discussed, especially

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bringing to the fore the opportunities that entrepreneurship provides for those are interested in initiating innovation and change. While change is desirable, it is important not to forget our rich traditional heritage of knowledge and skills. Many of the traditional occupations, when coupled with innovation, modern perspectives and good marketing, have tremendous economic potential.

The other chapters and units describe the five salient domains of HEFS. Within each domain, there are several fields that offer ample professional opportunities and occupational avenues. The syllabus and textbook attempt to bring to focus the scope and significance of each domain in the present day scenario, with inputs on knowledge and skills to be acquired and honed, including use of ICT for not only gathering information but also as part of practicals, activities and projects in order to be a 'valued' professional.

The practicals have been designed to enable learners to gain insights and also have a bird's eye view of the tasks and challenges inherent in the various professional careers and avenues. Considerable emphasis is laid on 'construction of knowledge' through field exposure and first-hand experiences. The exercises and projects would help to encourage critical thinking, develop analytical and writing skills and eventually inculcate the 'passion to learn'. Many insights and 'seeds' of information have been 'sown'. Students and teachers in partnership can explore, think about, discover and discuss a variety of topics and issues. Further learning is encouraged through select exercises and review questions at the end of each unit. Some of the issues of current concern that have been addressed, could not only be thought provoking, but also foster sensitivity and social responsibility in the use of this textbook. Exercises in understanding region-specific opportunities and available resources have been included to encourage students (with guidance from their teachers) to understand, appraise and appreciate their own socio-cultural ethos and locales.

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## Objectives

The Human Ecology and Family Sciences (HEFS) textbook for Class XII has been framed to enable the learners to:

1. understand the scope and significance of each domain within HEFS.
2. appreciate the importance of life skills for work, livelihood and careers.
3. become sensitive to the nuances of work vis-à-vis age and gender.
4. appreciate the potential of entrepreneurship and other varied professional opportunities.
5. make informed career choices.

A feedback questionnaire is given at the end. We will appreciate your comments and views about various aspects of this textbook. You may use the given questionnaire or write to us on a plain paper/send e-mail. Your feedback will help us to improve further reprint editions.



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# A Note to the Teachers

Dear Teachers,

You must have noted the radical changes in the organisation of these textbooks, compared to the conventional way in which Home Science education was earlier designed and delivered. However, the contents and the focus of the domains within Home Science (now called HEFS in the context of the revised NCERT syllabus), essentially remain undiluted. In fact, in the syllabus and textbook organisation, care has been taken to cover the basics and go further, to expose students to the newer and emerging horizons of the five domains – Food and Nutrition, Human Development and Family Studies, Fabric and Apparel, Resource Management, and Communication and Extension. This deliberate departure from the earlier convention is to dispel the misconception about the discipline being limited in focus and scope to domestic science, and art and craft. The effort is also to create an interest in the field for its varied, multidisciplinary strengths, both in terms of quality education and potential for professional avenues.

In each chapter from Unit 2 onwards, the textbook has been designed to inform the learners about the significance and scope of each domain, the multiple thrusts that exist and are emerging. Each unit spells out the basic concepts, requisite knowledge and skills in each thrust area and delineates the career avenues and the preparation required for them in order to make informed career choices.

Unit 1 is about work, life skills, careers and livelihoods. It starts with a description about meaningful work and moves on to point out the need to balance work with rest and recreation, to ensure a good standard of living and quality of life. Further, the chapter elaborates on success and happiness in work life resulting from wholesome attitudes and approaches to work. An attempt has been made therein to introduce and sensitise youth to ethics, social responsibility, volunteerism and dignity of labour. In this context, it is pertinent to discuss the rich heritage of traditional occupations of India, with a view to informing the students that with creativity and innovation, there are immense opportunities for a satisfying career. The immense potential of entrepreneurship as a challenging career avenue is brought to focus to further the interests of the youth, especially for those who would like to be their own masters, to create employment for others while being gainfully self-employed. The unit also delves into the importance of a healthy work environment and the need to sustain good occupational health, while being aware of occupational hazards and safety measures required. It is felt that youth of today need to understand current issues including work in the context of age (child labour and engaging senior citizens) and gender ( women and work). In this context, it is felt that the school(s) could invite 'guest faculty or experts' to interact with the students to enable them to obtain first hand realistic information.

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Teachers should note that considerable theoretical inputs are required for students and learners to gain deeper understanding and appreciation of the different areas in each domain. Therefore, some basic theoretical information has been included in each unit. This theory-based content should provide adequate material for testing students' achievement in acquisition of knowledge. Further, based on student interest and capability, and region–specific resources and facilities, teachers may motivate and help students to obtain more information in areas and issues of their interest. The inclusion of review questions, activities, exercises, practicals, field visits and reporting, are envisaged as opportunities for students to develop reading and writing skills as well as critical and analytical thinking. Gathering and processing information is important *per se.* However, students should be encouraged to think and discuss the various issues and topics delineated in this textbook as a means of helping youth to think, construct knowledge and articulate. All these experiences have been deliberately introduced so that learning may be meaningful and enjoyable.

It may be noted that in the units, the authors have included several activities and exercises, which are suitable and would enhance learning as well as relieve the tedium of classroom instruction. It is expected that teachers and students would decide upon the number of activities and exercises they can honestly complete within the academic year. Teachers may encourage students to do as many as possible in and outside the classroom to 'fan the flame' of curiosity and joyful learning. Use of ICT has been recommended in these textbooks for seeking information, for making power point presentations, designing educational and promotional materials. In all units, wherever possible, teachers are advised to ensure that the students have exposure and practice with ICT for various purposes.

In addition, a number of inter-disciplinary projects have been included. Every student should have an opportunity to participate in any one project, and it is expected that students would have an opportunity to participate in the chosen project either in groups or in pairs. Since the learners may be relatively unfamiliar with conducting projects, it is essential that the project be guided by the teacher throughout, from the planning stage to execution and report writing.

The syllabii for all chapters delineated in further detail are given herein. In the process of developing the textbook, the teams have expressed the need for highlighting and including and deleting some selected issues. Thus, some modifications have emerged that are indicated in a tabular form.

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| Class XII Syllabus printed in Class XI textbook | Modifications in the Class XII textbook |
|---|---|
| **Unit I:** Work, livelihood and career; Preparation, choices and selection<br>● Work, age and gender<br>● Occupational heritage of India<br>● Career options<br>● Entrepreneurship and self employment<br>● Life skills for career building | **Unit I:** Work, livelihood and career<br>● Quality of Life<br>● Social Responsibility and Volunteerism<br>● Traditional Occupations of India<br>● Work, Age and Gender<br>● Attitudes and Approaches to Work<br>● Life Skills and Quality of Work Life<br>● Work and Work Environment<br>● Entrepreneurship |
| **Unit II:** Career Opportunities<br>Scope of Human Ecology and Family Sciences in higher education and careers<br>Major concepts, relevance and skills in the following areas | Career Opportunities<br>Scope of Human Ecology and Family Sciences in higher education and careers<br>Major concepts, relevance and skills in the following units |
| **A. Nutrition, Food Science and Technology**<br>Specific Careers and Areas<br>● Clinical nutrition and dietetics<br>● Public nutrition and health<br>● Catering and food services management<br>● Food processing and technology<br>● Food quality and food safety | **Unit II:** Nutrition, Food Science and Technology<br>Specific Careers and Areas<br>● Clinical Nutrition and Dietetics<br>● Public Nutrition and Health<br>● Catering and Food Services Management<br>● Food Processing and Technology<br>● Food Quality and Food Safety |

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| Class XII Syllabus printed in Class XI textbook | Modifications in the Class XII textbook |
|---|---|
| **B. Human Development and Family Studies**<br>Specific Careers and Areas<br>● Early childhood care and education<br>● Guidance and counselling<br>● Special education and support services<br>● Support services for children in difficult circumstances<br>● Management of institutions and programs for children, youth and elderly | **Unit III:** Human Development and Family Studies<br>Specific Careers and Areas<br>● Early Childhood Care and Education<br>● Guidance and Counselling<br>● Special Education and Support Services<br>● Management of Support Services, Institutions and Programmes for Children, Youth and Elderly |
| **C. Fabric and Apparel**<br>Specific Careers and Areas<br>● Care and maintenance of fabrics in institutions<br>● Design for fabric and apparel<br>● Retailing and merchandising<br>● Production and quality control in garment industry<br>● Museumology and textile conservation | **Unit IV:** Fabric and Apparel<br>Specific Careers and Areas<br>● Design for Fabric and Apparel<br>● Fashion Merchandising<br>● Production and Quality Control in Garment Industry<br>● Textile Conservation in Museums<br>● Care and Maintenance of Fabrics in Institutions |

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| Class XII Syllabus printed in Class XI textbook | Modifications in the Class XII textbook |
|---|---|
| **D. Resource Management**<br>Specific Careers and Areas<br>● Human Resource Management<br>● Hospitality management<br>● Designing of interior and exterior space<br>● Event management<br>● Consumer services | **Unit V:** Resource Management<br>Specific Careers and Areas<br>● Human Resource Management<br>● Hospitality Management<br>● Ergonomics and Designing of Interior and Exterior Spaces<br>● Event Management<br>● Consumer Education and Protection |
| **E. Communication and Extension**<br>Specific Careers and Areas<br>● Management of development Programmes.<br>● Development communication and journalism<br>● Media management and advocacy<br>● Media design and production<br>● Corporate communication and public relations | **Unit VI:** Communication and Extension<br>Specific Careers and Areas<br>● Development Communication and Journalism<br>● Advocacy<br>● Media Management, Design and Production<br>● Corporate Communication and Public Relation<br>● Management of Development Programmes |

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# PRACTICALS AND PROJECTS

| Class XII Syllabus printed in Class XI textbook | Modifications in the Class XII textbook |
|---|---|
| **Nutrition, Food Science and Technology**<br>1. Qualitative tests on food adulteration<br>2. Development and preparation of supplementary foods for nutrition programmes<br>3. Planning messages for nutrition, health and life skills using different modes of communication for different focal groups<br>4. Preservation of foods using traditional and / or contemporary methods<br>5. Packaging and study of shelf life of the prepared products | **Nutrition, Food Science and Technology**<br>● Qualitative tests on food adulteration<br>● Development and preparation of supplementary foods for nutrition programmes<br>● Planning a menu for a school canteen or midday meal scheme<br>● Modification of a normal diet to soft diet for elderly person<br>● Design, Preparation and Evaluation of a processed food product |
| **Human Development and Family Studies**<br>6. Preparation and use of teaching aids, using indigenous and locally available material to communicate socially relevant messages for children, adolescents and adults in the community<br>7. Conducting mock sessions among peers in career guidance, nutrition counseling and personal counseling under supervision | **Human Development and Family Studies**<br>● Preparation and use of teaching aids, using indigenous and locally available material to communicate socially relevant messages for children, adolescents and adults in the community<br>● Conducting mock sessions among peers in career guidance, nutrition counselling and personal counselling under supervision |

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| **Fabric and Apparel**<br>8. Preparation of articles using applied textile design techniques: tie and dye/ batik/block printing<br>9. Application of quality control techniques in garment industry:<br>a. Fabric inspection<br>b. Quality of seams and notions<br>c. Size labels<br>d. Packaging<br>10. Care and maintenance of fabric products:<br>a. Mending<br>b. Cleaning<br>c. Storage | **Fabric and Apparel**<br>● Preparation of articles using applied textile design techniques: tie and dye/batik/ block printing<br>● Developing a female fashion figure<br>● Application of quality control techniques in garment industry:<br>a. Fabric inspection<br>b. Quality of seams and notions<br>c. Size labels<br>● Care and maintenance of fabric products:<br>a. Mending<br>b. Cleaning |
| **Resource Management**<br>11. Open an account in bank/ post office. Learn basic banking operations (Mock exercises in the lab with real bank forms)<br>12. Application of traditional/ contemporary techniques of home decorations:<br>a. Floor and wall decorations<br>b. Flower arrangement<br>c. Other forms of local decorations | **Resource Management**<br>● Observe and critically analyse any event on the basis of the specified criteria.<br>● Make a leaflet or a pamphlet for consumer education (any one of the following):<br>a. CPA (Consumer Protection Act)<br>b. Consumer responsibilities<br>c. Consumer organisations<br>d. Consumer problems<br>● Evaluate an advertisement |

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| Extension and Communication | Communication and Extension |
|---|---|
| 13. Analysis and discussion of print, radio, and electronic media with reference to: focus, presentation, technology and cost<br>14. Communicating with groups on any one of the following themes:<br>a. Social messages- gender equality, AIDs, female foeticide, child labour, rights abuse and other such themes<br>b. Scientific fact / discovery<br>c. Any significant incident/ event | ● Analysis and disccussion of<br>– print<br>– radio<br>– electronic media with reference to: focus, presentation, technology and cost |

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| Class XII Syllabus printed in Class XI textbook | Modifications in the Class XII textbook |
|---|---|
| **Projects**<br><br>Any one of the following may be undertaken and evaluated:<br><br>1. a. Analysis of traditional occupations prevalent in one's local area, their beginnings, present status and challenges faced<br><br>b. Analysis of gender roles, entrepreneurial opportunities, and future careers and family participation<br><br>2. Documentation of any public/mass campaign being implemented in own area, with reference to:<br><br>a. Purpose of campaign<br><br>b. Focal group<br><br>c. Modalities of implementation<br><br>d. Stakeholders involved<br><br>e. Media and methods used<br><br>Comment on the relevance of the campaign.<br><br>3. Study of an integrated community based programme being implemented in own area, with reference to:<br><br>a. Programme objectives<br><br>b. Focal group<br><br>c. Modalities of implementation<br><br>d. Stakeholders involved | **Projects**<br><br>Note: Any one of the following projects may be undertaken and evaluated:<br><br>1. a. Analysis of traditional occupations prevalent in one's local area, their beginnings, present status and challenges faced<br><br>b. Analyse gender roles, entrepreneurial opportunities and future careers and family participation<br><br>2. Documentation of any public/mass campaign being implemented in own area, with reference to:<br><br>a. Purpose of campaign<br><br>b. Focal group<br><br>c. Modalities of implementation<br><br>d. Stakeholders involved<br><br>e. Media and methods used<br><br>Comment on the relevance of the campaign.<br><br>3. Study of an integrated community-based, nutrition/health programme being implemented in own area, with reference to:<br><br>a. Programme objectives<br><br>b. Focal group<br><br>c. Modalities of implementation<br><br>d. Stakeholders involved |

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| 4. Visit to the neighbouring areas and interviews with two adolescents and two adults regarding their perception of persons with special needs<br>5. Take a profile of any one person with special needs, child or adult: to find out their diet, clothing, activities, physical and psychological needs<br>6. Observe and document any event in your school/ home or neighbourhood. Evaluate the same with respect to:<br>a. Relevance<br>b. Resource availability and mobilisation<br>c. Planning and execution of the event<br>d. Financial implications<br>e. Feedback from stakeholders<br>Suggest modifications for the future. | 4. Visit to the neighbouring areas and interviews with two adolescents and two adults regarding their perception of persons with special needs<br>5. Profile any one person with special needs, child or adult, to find out their diet, clothing, activities, physical and psychological needs<br>6. Plan and execute any event in your school. Evaluate the same with respect to:<br>a. Its relevance<br>b. Resource availability and mobilisation<br>c. Planning and execution of the event<br>d. Financial Implications<br>e. Feedback from stakeholders<br>f. Suggest modifications for the future.<br>7. Planning messages for nutrition, health and life skills using different modes of communication for different focal groups.<br>8. Market survey of processed foods, their packaging and label information. |

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# Constitution of India

**Part IV A (Article 51 A)**

# Fundamental Duties

It shall be the duty of every citizen of India —

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wildlife and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

*(k) who is a parent or guardian, to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

**Note:** The Article 51A containing Fundamental Duties was inserted by the Constitution (42nd Amendment) Act, 1976 (with effect from 3 January 1977).

*(k) was inserted by the Constitution (86th Amendment) Act, 2002 (with effect from 1 April 2010).



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# UNIT I

# WORK, LIVELIHOOD AND CAREER

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CHAPTER

1

# WORK, LIVELIHOOD AND CAREER

## LEARNING OBJECTIVES

After completing this chapter, the learner will be able to:

- explain meaningful work, livelihood, careers and entrepreneurship.
- understand the concepts of standard of living and quality of life.
- know the importance of social responsibility and volunteerism.
- explain the attitudes and approaches that contribute to quality of work life and successful careers.
- be sensitive to the issues of work in relation to traditional occupations and special groups namely women, children and elderly.
- describe the characteristics of a healthy work environment

## INTRODUCTION

Deciding a career for oneself is not an easy task. On one hand, there are several career avenues to choose from, and on the other, for a young person, aptitude and talent are yet to be identified and recognised. Also in some cases, interests are very diverse. Thus, it is not easy to make a choice. In order to make the right choice, it is essential that youth be exposed to different possible options. First, it is important to explore oneself in order

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to identify one's own aptitudes, talent, personal preferences, needs and aspirations. Then the exploration of options must start, in which one tries to combine one's strength for personal benefit as well as social contribution. An appropriate choice will bring the person success and satisfaction.

**Work and Meaningful Work**

Work is primarily an activity that all human beings have to perform and through which each one 'fits' into the world, creates new relations, uses an individual's unique talents and skills and above all, learns and grows to develop one's identity and a sense of belongingness to society. Work can be described as essential activities undertaken for a purpose or out of necessity.

Work is central in all cultures, although every culture has its own values and perceptions about it. In fact, work essentially constitutes the bulk of daily life activities for all human beings. The type of work undertaken by people depends on several factors such as education, health, age, access to opportunities, globalisation, geographic location, financial returns, family background and so on.

Most human beings work to acquire money, provide for their families, and to earn leisure, recreation, play and free time. Work can serve as a catalyst for developing one's personal identity and boosting self-esteem. Work contributes in many forms. When we work, we contribute to ourselves—our sense of confidence or well-being and for financial gain. We also contribute to the organisation that employs us by helping to create better products or a better reputation for the organisation, or greater profits. Our work has an impact on the quality of life in the world around us.

It can be rightly said that 'work is the oil that lubricates the machine of society'. Not only human beings, but all creatures and elements of nature are constantly 'working', contributing to life itself. In fact, it is the collective work of humans and nature that gives us our basic necessities, comforts and luxuries. While in most cases, work primarily enables the worker to earn a livelihood, there are persons who work ceaselessly for pleasure, intellectual stimulation, contribution to society *per se*, despite the fact that they do not earn any amount of money, for example, the work done by family members for the family, volunteers, etc. Thus, work is not always about how much money a person earns; rather it is about whether one makes a contribution to oneself, one's family, one's employers, to society, to nation or to the world.



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Work may be viewed as:

- A 'job' and a means of making a 'living'.
- A task, or duty that entails a sense of obligation.
- A means of security of livelihood through securing job and income.
- *'Dharma'* or duty, an expression of one's true Self, an expression of one's unique talents that influences the quality of life of self and others around us.
- A part of spiritual practice.
- A vehicle for one's creations.
- A source of joy and fulfillment.
- Working and earning one's livelihood offers scope for hope, self-esteem and dignity.
- A symbol of status, power and control.
- A rewarding experience, a sort of mental or physical workout that can result in success.
- A means of self development and self-actualisation (reflecting values and aspirations).

When an individual is involved in meaningful work, s/he develops a sense of identity, worth, and dignity.

*What is meaningful work?* : Meaningful work is useful to society or to others, is done responsibly and is enjoyable to the worker. It enables the worker to use his/her skills and judgment, to showcase his/her creativity, or problem-solving ability. Ideally, work should be performed in an environment that stimulates the development of positive professional relationships and also brings recognition and/or rewards.

When the outcome or result of the work performed is meaningful or successful, it contributes to personal growth, instills confidence and self worth and may eventually even lead to actualisation of full potential. Work provides opportunities to contribute to the improvement of one's own life conditions and that of society in the wider context.

For any person, being involved in work (as an employee or self employed) that best suits one's personal attributes, talents or aptitude, competence and skills is very important. This paves the way for a life long career. So it is important to choose something to sustain the individual's enthusiasm to carry on his/her work. Therefore, the work life for anyone and everyone should ideally be an expression of one's potentials and aspirations. Persons entering work life and also those thinking of building a career can ask themselves the following questions:

- What are my special talents, traits and interests vis–a–vis an occupation?

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- Is the work stimulating and challenging?
- Is the occupation likely to give me a sense of being useful?
- Does the job make me feel that I am contributing to society?
- Are the ethos and environment of the workplace likely to be suitable to me?

For most persons, it is definitely imperative and obligatory to earn a livelihood in order to fulfill the basic needs of self and family. Most work can be for earning money – such work is conventionally referred to as a 'job'. However, many individuals choose to go beyond a job, to make a career, working steadily on a chosen career path. Thus a 'career' is more than just a job. One may distinguish between a job and a career by saying 'job is an involvement in work for the sake of it' whereas 'a career is driven by a deep desire to excel and a passionate need to grow, develop and prove oneself within the chosen field of work'.

There have been changes in concepts about careers over the years. It is no longer sufficient to get a job. It is very important to continually upgrade and learn newer skills, update knowledge and build or enhance competencies, in order to achieve success. Thus, in the modern world, education should not stop in youth or early adulthood but needs to continue into one's middle career years and if necessary, into one's later career years.

How does one decide what career to pursue? Many children may choose to follow in their parents' footsteps. Others may select careers that differ from their parents or what their parents might have planned for them. One of the most important criteria for selecting an avenue is that one must feel a sense of keen interest and desire for the chosen path. One of the crucial aspects in making decisions about the choice of career is that one must find enjoyment in the job, particularly when one assumes financial responsibility for the family.

**Work, Careers and Livelihoods**

Work is a set of activities with an intended set of outcomes. Yet it is not necessarily tied to paid employment, but may include entrepreneurship, consulting, volunteerism, contract, social work for community welfare and other professional activities. Livelihood denotes the means and occupation by which a person supports oneself to meet basic needs, and sustain one's lifestyle. It involves choice of occupation and career path and the design of a work lifestyle. On the other hand, careers are unique to each person and are dynamic, unfolding throughout life. Career is a life management concept. Growing in one's career is a lifelong process that involves managing roles, maintaining a balance between paid and unpaid work, learning, personal life roles, and making transitions whenever or wherever necessary to move towards a personally determined future. The



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Webster dictionary defines career as "a field for or pursuit of consecutive progressive achievement especially in public, professional, or business life" and work as "the labor, task, or duty that is one's accustomed means of livelihood/profession or occupation chosen as one's life's work". Whatever one chooses, in a holistic sense it should nourish body as well as mind and benefit self as well as others.

Work has several perspectives. By and large, the popular connotations of work are:

(i) *Work as a job and livelihood:* Here work is mainly a source of income enabling desired outcomes; for instance, doing a job to support one's family. The person finds job satisfaction primarily from the income earned.

(ii) *Work as a career:* The person views his/her work as a path to progressively ascend professionally in terms of higher posts/positions, status, pay, and responsibility. A person who works for a career will dedicate considerable amounts of time and energy to the work, because these are temporary costs of future gain. Such a person gets job satisfaction from continuing advancement and achievements.

(iii) *Work as a calling:* Seeing work as a calling, a person derives satisfaction from the work itself. The person feels called to do the work based on inner drives and the feeling that the work derives from an inner or higher direction.

The following anecdote illustrates the concepts discussed hitherto: *Three men were breaking boulders with strong hammers. When asked what they were doing, the first man answered, "This is my job, I am breaking these rocks into smaller pieces". The second man said, "This is my livelihood. I break rocks to make a living in order to feed my family". The third man said "I have a vision, to become a sculptor and therefore I am carving a statue out of this big stone".* The third man, visualised that each hammer blow would contribute to the shaping of his career, while the first and second men were clearly focused on their job and livelihood.

## Review Questions

- What are the different ways in which work can be perceived?
- Differentiate between job and career.
- What is meant by meaningful work?

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# Traditional Occupations of India

India is one of the richest countries as far as art and culture are concerned. Few countries in the world have such an ancient and diverse culture as does this country. Despite diversity, there has been cultural and social cohesiveness of an enduring nature. Over the years, the stability of this culture has been maintained more through the social and cultural practices, though there have been some disruptions through foreign invasions and upheavals.

Agriculture has been one of the major occupations for a large proportion of the population because the climatic conditions in most parts of India are suitable for agricultural activities. Since almost 70 per cent of the population lives in rural areas, farming is the largest source of employment for millions of people. A considerable proportion of them are involved in farming small plots of land, many of which may not even be owned by them leading to only marginal production of crops. Such poor yield may not be even sufficient for family consumption, leave alone permitting sale of produce for profit. In most parts of the country, some farmers produce cash crops for sale in urban markets, and in some areas, crops such as tea, coffee, cardamom and rubber are of great economic importance because they bring in foreign exchange. India is the largest producer of cashew nut, coconut, milk, ginger, turmeric and black pepper in the world. It is the one of the largest producers of fruits and vegetables, spices and condiments and tea. Yet another important traditional occupation has been fishing because of the country's very long coastline.

Handicrafts have been one of the traditional occupations in Indian villages, and today many Indian arts and crafts are very popular in the international market and have become a means of livelihood for the rural folk. Some examples of crafts are wood craft, pottery, metal craft, jewellery making, ivory craft, comb craft, glass and paper craft, embroidery, weaving, dyeing and printing, shell craft, sculpture, terracotta, sholapitha craft, dhurries, rugs and carpets, clay and iron items, etc. Weaving is a cottage industry in India. Each state has typical woven fabrics, embroideries and traditional costumes which are suitable for the region-specific climate and life style. Different regions in India are famous for different types of weaving. Indian hand-woven fabrics have won acclaim for centuries.



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In the past many of these were made for daily use and others for decorative purposes. These occupations and many others are reflective of the base of the socio-economic culture. However, the modern economy has catapulted such craft items into the global market, earning the country considerable foreign exchange.

*Shola craft of Odisha*

*Channapatna dolls of Karnataka*

*Stone Sculpture*

Traditionally, the processes, techniques and skills of the crafting and manufacturing were handed from one generation to the next, to members within the family. The transfer of this indigenous knowledge and training thereof, was primarily home-based training, and the know-how and finer nuances were tightly guarded secrets within closed groups in a given occupation. In India, the dynamics of religion, caste and occupation have been tightly interwoven, coupled with hierarchical order of clusters within the social fabric of the country. There are hundreds of different traditional occupations, for example, hunting and trapping birds and animals, gathering and selling foreign produce, garland making, salt making, tapping of *neera* or palm sap juice, mining, brick and tile making. Other inter-generational traditional occupations include priests, sweepers, scavengers, leather workers, etc.

Like weaving, embroidery and the visual arts, each region of India has a typical cuisine, comprising a vast variety of local foods cooked with indigenous ingredients and spices. India is well known for its tasty, tongue-tickling cuisine which has emerged as a source of livelihood for innumerable persons, ranging from street food vendors to speciality restaurants and theme pavilions in 5-star hotels. Many popular traditional foods and spice mixes and *masalas* are in demand in other countries.

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*Embroidery and Textiles of India*

India has a multiplicity of visual arts that have been in practice for over four thousand years. Historically, the artists and artisans were supported by two main categories of patrons: the larger Hindu temples and the princely rulers of various states. The main visual arts arose in the context of religious worship. Distinctive regional styles of architecture are seen in different parts of India, reflecting various religions namely Islam, Sikhism, Jainism, Christianity and Hinduism, which typically co-existed across the country. Therefore in different places of worship and mausoleums (burial chambers), palaces, etc. a great variety of images skilfully carved in stone, or cast in bronze or silver, or modeled in terra-cotta or wood or colourfully painted were commonly prevalent, most of which have been preserved in India's vast heritage. In the modern scenario, these arts are preserved and promoted through the efforts of government and several non-governmental organisations, providing occupational avenues including entrepreneurship.

*Warli Painting of Maharashtra* *Puppetry Craft*

Despite the rich heritage of traditional occupations, in the modern context, these works of art are gradually losing out to mass–produced goods, leaving the artisans with meager sources of income on the one

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hand and a gradual erosion of the aesthetic appreciation of fine arts on the other. Illiteracy, general socio-economic backwardness, slow progress in implementing land reforms and inadequate or inefficient finance and marketing services are major constraints that cause this trend. Shrinkage of forests, depletion of resource base and general environmental degradation are responsible for various problems faced in this context.

*Coconut craft of Kerala*

*Bamboo craft of Assam*

These are tremendous challenges and indicate an urgent need for the revival and sustaining of the indigenous knowledge, know-how and skills which are fast losing ground. Some of the areas where interventions are required are design innovations, preservation and refinement strategies, use of eco-friendly raw materials, packaging, establishment of training facilities, conservation of traditional knowledge and protection of intellectual property rights (IPR). It is important for the modern youth and communities to be aware of the tremendous scope and potential for career avenues for individuals. In addition, such efforts and initiatives will go a long way to enhance the income generation potential of the rural folk. It is worthy to note that the Government of India is making concerted efforts in this direction. The need of the hour and the challenge confronting Indian society is to maintain the diversity without the hierarchy or caste-based work divisions in the democratic milieu.

**Activity 3**

Visits to local artisans can be arranged by the school. This may be followed by students preparing resource file on the local traditional arts, crafts, cuisines.

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**Activity 4**

An exhibition may be organised to showcase the local traditional arts and crafts.



# Work, Age and Gender

The age and sex of members of any workforce influence the dynamics of personal and professional lives, both from the perspective of the individual (micro perspective) and also that of society and nation(macro perspective). The health and development of children and women is at stake when they are forced into labour that is not suitable to their physiological and psychological state. These segments of the population as well as the elder population need attention from several perspectives. Let us briefly discuss the challenges facing these three groups.

**Gender Issues in Relation to Work**

Nature distinguishes the two sexes clearly in most forms of life, with biological and functional differences being well established. Human beings generally differentiate between the two sexes, i.e. men and women. However, lately India's Supreme Court has recognised transgender people as a third gender who are also refered to as transsexual, cross dressers etc. The differences between men and women range from biological to socio-cultural. The terms '**sex**' and '**gender**' indicate the differentiations from the biological to the social and cultural perspectives. The term sex and gender are often used interchangeably, but strictly speaking they have different biological meanings. Sex refers to the bilogical categorisation based on genetics, reproductive organs or similar things, whereas, gender is based on social identity. Male denotes boys and men whereas female denotes girls and women. The external manifestation of sex is through the primary sexual organs or the genitals. This difference is due to XX and XY or some other chromosome combinations. In every society, the social and cultural practices determine how various genders are expected to behave and the type of work they do, thus constructing the identity of individual's right from an early age which slowly continues to impact all throughout their growth and development. The members of any society or community are expected to perform their roles in particular ways as demanded by social and cultural traditions thereby creating and establishing norms of gender role identity. Over a period of time, these norms and practices become stereotyped and then it is considered the normal and expected behaviour from each one of its members. Although these norms and practices are

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not written down and there is no rule book for these, they are generally passed on from one generation to another and continue to be practised. Therefore, it is said that *Gender is socially constructed*.

Any deviation from that normal and expected becomes unconventional, non-traditional and sometimes even defiant. However, with time roles and behaviours are evolving, resulting in 'continuity with change'. It can be seen that the age old assigned roles as bread winner for men and as home maker for women are in transition. However, in India, women have all along been engaged in production and in some societies even in marketing. In rural India, women are intensively and extensively involved in agriculture and animal husbandry. In urban areas, women are involved in construction activities or are employed as domestic labour. All these are working women and have been contributing to the income of the family in one way or the other. In many families, women are the sole bread-earners.

Despite their active participation in earning and contributing to the family resources, freedom to make decisions and vogue to independence are denied to women. Women therefore continue to remain powerless. The need of the hour is to educate and empower women and give them their rightful voice and place in society.

Women cannot be empowered until the work they do at home is valued and is considered equivalent to paid work. The work performed by women as homemakers has rarely been valued or even counted as an economic activity. However, there is a saying 'money saved is money earned'. The household chores and the domestic work that women do to support the family, in all stages of their life as mother, sister, daughter, wife and grandmother, demands energy throughout their lifetime. Such contributions help other members of the family to perform their roles and duties more efficiently. Therefore, domestic work done by women needs to be valued as an economic contribution and productive activity.

Women's participation in the workforce outside the home has helped emancipate the woman as well as improve the family's resources. Women have started participating in each sector of the economy, many of them occupying senior positions. However, this has placed a double burden on women, since they are still expected to perform most or all of their household chores and be the primary caregivers.

## Issues and Concerns Related to Women and Work

Opportunities of participation by women in the labour market have declined and they have been marginalised due to the need for skilled workers. Therefore, to safeguard the interests of women, training facilities to develop skills need to be increased. Primary earning members are considered to be



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men and women's earnings are considered supplementary and secondary, and even if they are sole bread earners, they do not have a similar standing in the market. Some of the other issues concerning women in modern India are stress and adverse effects on health, security and safety at work places without gender discrimination, maternity benefits and social support for child care.

*Constitutional Rights, Acts and The State Initiatives:* It is important to note that the Constitution of India guarantees equality to both men and women in all walks of life, including guaranteeing equal opportunity for all citizens in matters relating to employment or appointment to any office under the State and forbids discrimination in respect of any employment or office on grounds of caste, creed, colour, race or sex. It also stipulates that women workers be provided just and humane conditions of work and be protected from any kind of exploitation, and be supported and encouraged in their educational and economic pursuits. The Indian Constitution also empowers the State to make special provisions for women and children. Also, there are Acts which safeguard Constitutional rights of women such as the Factories Act of 1948, the Plantation Labour Act of 1951, the Mines Act of 1952, etc. which provide protection to women in various industrial sectors, Employees State Insurance Act (ESI Act) and the Maternity Benefit Act, 1961.

> Article 16 (1) of the Constitution of India guarantees equality of opportunity for all citizens in matters relating to employment and appointment to any office under the state.

Besides this, Section 48 of the Factories Act states that creches should be maintained if more than 30 women are employed in an industry or factory. Children below six years should be looked after in these crèches which will be maintained by the industry itself. Many state initiatives were taken to improve the condition of women in employment and in need of employment. Women's cells were created in the Ministry of Labour to look at the problems of women workers. The Equal Remuneration Act for equal wages for the same work or work of a similar nature also came into force. A National Plan of Action (NPA) for women was taken up by the Department of Social Welfare to implement the Equal Remuneration Act. A working group on women's employment was also constituted by the Planning Commission for enhancing the employment opportunities for women belonging to rural areas and to review the labour laws on women's work and their participation in economic and productive activities. A steering



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committee to build the data base on women's work, particularly in the rural areas, was also formed by the Planning Commission.

Over the years there has been a paradigm shift in the ways women's programmes have been initiated. During the earlier decades the programmes for women were based on the welfare approach, slowly it moved to equality of opportunity and then finally to development approach. It was realised that until women's development programmes are in full swing benefits cannot be reaped as women are part of human resource. Although in some sectors women have been achievers, economically and financially they have to march long roads to achieve equal partnership with men. The mindset has to be modern. The attitude and approach have to change to ensure dramatic transformation in the way gender issues related to work are approached in the society.

*Kasturba Gandhi Balika Vidyalaya (KGBV):* KGBV was initiated as a scheme of Government of India under *Sarva Shiksha Abhiyaan* (SSA). Currently, it is subsumed under *Samagra Shiksha Abhiyaan*, an overarching scheme and the umbrella programme of Government of India for the school education. KGBV started as a scheme for bringing never-enrolled and dropout girls from rural, remote and disadvantaged sections of the society into school education till elementary level in residential schools. The scheme now has been extended till Class XII to ensure inclusive and equitable quality education at all levels of school education. All the girls enrolled in KGBVs study the Bridge Course for preparing them for the entry level. The entry level in KGBVs for these girls is Class VI. The KGBVs have been opened in backward blocks of each district. This scheme also helps in the implementation of 'Right to Education Act' (RTE) of the Government of India.

**Woman Entrepreneur**

Kiran Mazumdar Shaw (a Biotechnologist), the Chairperson and Managing Director of Biocon India Ltd., is an eminent woman entrepreneur. She started her professional career as a trainee brewer in Carlton & United Beverages and in 1978 formed her own company, Biocon India Ltd. Under her leadership, Biocon has transformed to an integrated biopharmaceutical company with strategic research initiatives. Today Biocon is India's pioneering enterprise. Kiran Mazumdar Shaw received many prestigious awards such as ET Business Woman of the Year, Leading Exporter, Technology Pioneer and Best Woman Entrepreneur. In 1989 she was honoured with Padmashri and in 2005 with Padma Bhushan. She continues to be a model entrepreneur and a successful technocrat of global understanding.

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## REVIEW QUESTIONS

- What do you understand by the terms gender and sex?
- Who are home makers? What is their contribution in the economy of the family?
- How will the women get recognition in the family and the society?
- How are women guaranteed equality in India?
- What are the government initiatives in favour of women?

### ACTIVITY 5

Find out about organisations or individuals in your region who are helping women to become empowered and self-reliant.

Make a scrap book and display for the entire school.

### ACTIVITY 6

Collect information on women in your region who have contributed significantly to society.

### ACTIVITY 7

Prepare a power point presentation (with the help of teachers) of distinguished women in Science, Technology, Mathematics, Sports, Education, Literature, Medicine and other important areas.

***Organised Efforts for Empowerment of Women***

Shri Mahila Griha Udyog Lijjat Papad is an organisation of, by and for women. Its objective is to provide employment to women to enable them to earn a decent and dignified livelihood. This society was started in 1959 with 7 members and in 1966 it was registered under the Bombay Public Trust and Societies Registration Act. During this period it also got recognition from Khadi and Village Industries (KVIC) as a 'village industry'. Later *Lijjat* was also awarded 'Best Village Industry'. Today their products include *Khakhra, masala, wadi,* detergent powder, *chapattis,* cakes and other bakery products. The society gives self employment to about 45,000 members all over India with the sales turnover of ₹ 1,600 crores annually including export to many countries, paving the way for women to become self-reliant.

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# Attitudes and Approaches to Work, Life Skills and Quality of Work Life

## Attitudes and Approaches to Work

The attitude towards work is not only about the work / job itself. It is also about how any individual perceives ones' own work situation, handles the circumstances and demands of the job and the various tasks entailed. An individual's experience of job satisfaction or dissatisfaction is considerably influenced by their attitude, rather than being determined entirely by the job *per se*. Further, an individual's perception can be affected by comparisons they may make. For instance, if a person compares only the salary s/he receives with that of another, without taking into account the work responsibilities, the qualifications required, the work output, sincerity and dedication of the other person, there is scope for dissatisfaction. On the other hand, under realistic scrutiny of all aspects (both positive and negative) of one's own job, the possibility of satisfaction and happiness is greater. Most people spend a considerable proportion of time everyday at work. Therefore, the importance of work routines being established along with good health practices such as eating healthy, balanced diets, sleeping well and using leisure time proactively should be emphasised. But often, some people perceive work as something they have to 'do somehow or anyhow' and therefore are unable to enjoy or even think of enjoying the work. However, when a person perceives his/her 'work' as a source of energy, fulfillment and learning, job satisfaction is ensured.

On the other hand, some persons enjoy their jobs, look forward to challenges, handle difficult tasks with a positive outlook and this makes them feel good about their jobs. Similarly, opportunities for progress in their career and to use their abilities, skills and knowledge contribute to personal happiness and the 'quality of working life' of the organisation.

## Quality of Work Life

Quality of Work Life (QWL) of employees is considered important by organisations. In this approach, the employees are considered to be 'assets' and it is believed that people perform better when they are satisfied with their work conditions. It is generally accepted that satisfying employees' social and psychological needs is as important as satisfying their economic needs to help motivate them. It incorporates several perspectives which are not only work-based factors such as job and career satisfaction, satisfaction with pay and relationships with work colleagues, absence of

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stress at work, and opportunities for participative decision making, balance between work / career and home and general feelings of well-being.

All human beings like to survive and thrive in an environment that encourages and motivates them to do all the good work that they are capable of. Therefore, it is crucial to have a culture of creating happy and healthy work environments, not only in the physical and social sense but also in the deeper psychological / mental and emotional aspects. A healthy work environment is a positive work environment. Such an environment can be created by focusing on:

- Paying adequate attention to the individual employee's needs and expectations in addition to organisational needs
- Building a positive work climate
- Motivating individuals
- Being fair and treating people equally
- Ensuring and facilitating technical competence
- Providing an attractive and safe work environment
- Making the job interesting and challenging
- Matching the person to the task
- Delegating wherever necessary
- Fostering team spirit and team responsibility
- Developing employees through training, building confidence, feedback, encouragement and praise, support, positive reinforcement and involvement
- Empowering employees, giving them authority wherever appropriate
- Sustained opportunities for self-development

All of this can help the employer to boost the morale of those involved in the organisation/ work place. In short, any wise employer / manager recognises that people are assets and are the ultimate valuable resource. Hence creating an environment where employees feel a sense of loyalty to the organisation and organisational development is as important as self development.

It is important not only to focus on the pay package but also to look at the entire life holistically. It is not how much you make that matters. What is important is whether or not you are able to live your life in a happy way. Look at your life as a whole. Think about your free time, your family, your friends, etc. This will help you to reach retirement age without remorse and regret about why you did not spend them on things that were more important.



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One of the prerequisites is to possess and hone certain life skills that will help us to function effectively, with minimum stress and maximum productivity in personal and professional lives.

**Life Skills for Livelihood**

Life skills are abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life.

Why are life skills important? Life skills help people to deal with the demands and challenges of everyday life. They are important because they apply across the life span and promote and protect life, health and well-being in all situations. According to the World Health Organisation, life skills are thinking, coping, and social skills, which are abilities that can enhance people's interactions with others and with the environment, and which may even give rise to greater individual resilience in situations of adversity.

Ten core sets of skills have been identified by experts:

| | |
|---|---|
| Self-awareness | Empathy |
| Communication | Interpersonal relationships |
| Decision making | Problem solving |
| Creative thinking | Critical thinking |
| Coping with emotions | Coping with stress |

Life skills are abilities that enable people to behave in healthy ways, particularly in situations that challenge them. It is important to develop appropriate skills as indicated above, in order to prevent manifesting unhealthy or negative behaviour. Appropriate and adequate knowledge, attitudes and values enable one to develop healthy life skills, and prevent negative health behaviour as indicated in the conceptual model below:

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Life skills enable people to act in ways that can contribute to personal and social changes for the promotion of their own health and development, as well as that of the communities in which they live. They are needed by individuals to function effectively and constructively in society. They include personal and social skills and help the person to function confidently and competently in their families and in society. Life skills are competencies and actual behaviours which cannot be taught in a classroom; rather experiential learning helps people to acquire them.

**Improving One's Own Work Life**

Improving work life in totality is crucial for the organisation. However, it is more vital for each individual to consciously improve one's work life and thereby ensure job satisfaction and enhanced quality and quantity of output. Quality of work life from the perspective of the employee/worker is not so much about the job alone but also about how it is perceived by him/her. Towards this it is important to look at one's work as a source of energy, fulfilment and learning. Some general tips in this context are given herein:

- *Develop healthy personal habits.* Take care of one's body, mind and spirit, maintaining a healthy lifestyle, by eating a wholesome diet, taking adequate and appropriate exercise and getting enough sleep. Such a lifestyle is helpful to face challenges and pressures at the workplace.
- *Be empathetic and compassionate.* Interacting with peers, subordinates and supervisors is inevitable and calls for empathetic approach, which in turn will yield positive outcomes.
- All persons at work have to remember the interdependence on each other, personally, professionally and psychologically. Positive attitudes and behaviour and interactions with peers, subordinates and supervisors will generate goodwill all round. People who help each other tend to experience greater satisfaction and reward and help a person to fulfil her / his own needs. Good communication and interpersonal skills are vital for successful completion of tasks and career development.
- It is important to maintain loyalty and commitment to the organisation and to be *professionally ethical* at all times.
- *Encourage partnerships and work as a member of a team.*
- People who help each other in this way tend to experience greater satisfaction and reward. Interactions with others should generate



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results for mutual benefit. Work in collaboration with others, respecting and recognising their contributions and achievements.

- It is wise to *be responsive to situations and not reactive*. For example, when faced with a reprimand at work by a senior, it is appropriate to respond by examining the situation realistically and calmly, rather than react with justifications and emotional outbursts. If the reprimand is deserved, one should take corrective measures, including apologising, if necessary.
- *Flexibility, adaptability and problem-solving attitude and skills are core abilities* essential in the work arena, whether you are self-employed or working for others.
- *Be a good citizen and create a healthy community around you.*
- People who follow these tips tend to attract like-minded persons. Together, they can often create a community of like-minded folks who strive to get the job done while serving everybody's needs. For job satisfaction, be a good citizen within your organisation, recognise others for their achievements and work in collaboration with others to effect responsible change.
- *Learn from the lessons of life.*

  Job satisfaction is all about taking those day-to-day challenges, pressures and upsetting situations and turning them into life lessons that allow you to grow and move on as a better, more fulfilled person and professional.

This balance between life and work is not easy to achieve but the ability to positively adapt to societal and environmental change is essential. In any occupation, core abilities/essential workplace skills are the basic requirements. They cannot be taught as 'academic lessons' in schools or colleges, but they are vital to enable persons to become competent, and have to be acquired and honed as one develops as a person.

## Review Questions

1. Explain the terms:
   (a) Quality of work life
   (b) Life skills
2. What is meant by healthy work environment? How can it be created?

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**Essential Soft Skills at Workplace**

- *Working productively* — The worker applies effective work habits and attitudes in his/her job and tasks. This requires sufficient knowledge, skills and expertise as well as experience. Productivity is also influenced by enthusiasm, zeal and dynamism. Involvement with the job and sense of belonging to the organisation are important factors.
- *Learning effectively* — Every individual requires some necessary skills in reading, writing, and computing as well as skills in acquiring information within the field, and ability to use learning tools and strategies. Equally essential is the motivation to work hard and update oneself to keep pace with advances/ developments in one's field in order to be acclaimed/ renowned in the field.
- *Communicating clearly* — Apply appropriate writing, speaking, and listening skills so that one can precisely convey information, ideas, and opinions.
- *Working cooperatively* — Every individual must work with others to complete tasks, solve problems, resolve conflicts, provide information, and offer support. Cultivate a sense of belonging to the organisation
- *Thinking critically and creatively* — Every successful person applies the principles and strategies of analytical thinking, critical evaluation, being innovative and creative.
- *Other skills required* — Concentration, alertness, presence of mind, tactfulness, empathy, soft skills, abilities to train, to delegate and to get others to do their work, forethought and vision, and the ability to multitask.

**Work, Ethics and Dignity of Labour**

Work, whether a paid job or unpaid work in the home, as a caregiver, or in a volunteer capacity, is fundamental to human nature. Every human being is infinitely worthy; however, in modern times wealth is being given more importance. Whatever the type of work done, or the position held, or financial status, every person deserves respect. The Universal Declaration of Human Rights states that all human beings are born free and equal in dignity and rights. Every individual, through his or her share of work, however big or small, contributes to the betterment of the society.

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Dignity of labour means that the person takes pride in whatever she/he does. Abraham Lincoln was the son of a farmer and rose from a penniless boy to become the President of the United States of America. Mahatma Gandhi was a shining example of the dignity of labour. He did sweeping, scavenging and cleaning in his 'Ashram' in Wardha. He never felt degraded or insulted in doing the jobs that some people consider inferior or menial. He used to clean his own toilet, to demonstrate the dignity of labour.

In this context, it is necessary to remember that whatever a person does should be driven by values and ethics. Values and ethics provide behavioural rules. Values are beliefs, preferences, or assumptions about what is desirable or good for humans. Values affect how we practise. There are six important values: service, social justice, dignity and worth of all persons, importance of human relationships and integrity.

Ethics are a formal system or set of rules which are explicitly adopted by a group of people, e.g., professional ethics, medical ethics. Ethics can be defined as 'the rules or standards governing the conduct of a person or the members of a profession'. Being ethical at all times, earns respect of one's colleagues or peers and encourages them also to be ethical. At the workplace, values and ethics help to reduce waste of time and money and simultaneously increase employee morale, confidence and productivity.

In all work settings, generic norms of ethics and dignity are applicable. However, young workers/children and senior citizens as well as the female workforce are special groups and their presence in the workplace has many implications and ramifications in terms of their own quality of life as well as the society at large.

**Review Questions**

- What is meant by dignity of labour?
- Explain briefly the role of values and ethics in professional life.

## Ergonomics

Ergonomics is the study of humans at work, in order to understand the complex interrelationships of people with their job requirements, methods of working, tools/equipment used and the environment. Ergonomics is derived from two Greek words — 'ergon' (work) and 'nomics' (natural laws). It may also be spoken of as 'Human Factors Engineering'. In short, ergonomics is the study of work with the primary goal being to adapt the work environment to the worker. The objective is to generate

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working conditions that are not hazardous to human health, are acceptable to the workers / the work force and are optimal for work output and productivity.

Ergonomics is "Adjustment of human and Machine". It involves application of human biological sciences combined with engineering science to achieve optimum *mutual adjustment of human work*, with the benefit being measured in terms of human efficiency and well being. Tools, machines and workstations are designed to fit the work so that stress and problems reduce stress and health problems.

Important aspects that are considered by ergonomists are in relation to worker capacity (both physiological and psychological), task demands (comprising nature and complexity, force required, duration, posture) and the work environment (noise, humidity, vibration, light, temperature). The science of ergonomics is set on the four pillars, namely anthropometry (body size and measurements), biomechanics (musculoskeletal activities and forces exerted), physiology and industrial psychology.

Need for ergonomics:

Use of ergonomics in the workplace is important for :

- Improving safety and health by
  - reducing number and severity of workplace injuries.
  - reducing possibility of accidents due to human error.
- Improving job effectiveness by
  - increasing productivity
  - reducing errors
  - eliminating or reducing injuries

Ergonomics: An effective productivity tool that addresses matters related to:

- workplace / workstation design
- task design / design of work methods
- equipment design
- facilities
- environment



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- Improving job effectiveness by
  - increasing job satisfaction through comfortable working conditions.

Benefits of Ergonomics

- Reduces risk of injury and accidents
- Increases productivity
- Reduces mistakes and need to do the work again
- Increases efficiency
- Decreases absenteeism due to ill health / accidents / stress
- Improves morale of workers.

The importance of ergonomics can be illustrated with a simple example. For a person who does office work, sitting on a chair that does not conform to ergonomic safety specifications can cause back pain. According to ergonomic principles, it is necessary that the chair height and stand be adjustable to the user's height and body measurements. The number of chair legs must be suitable to its size to avoid falling.

Any ergonomics intervention must be viewed in light of its effect on productivity, and the best ergonomics solutions will often improve productivity. Simply put, reducing unnecessary or awkward postures and exertions almost necessarily reduces the time it takes to complete a given task, thus improving productivity. Creating a safe and productive work environment is critical for any work place. Employees represent an organisation's most important asset. When a task is matched with the ability of the people who will perform it, they will make fewer errors and produce less waste. Ergonomic design considerations have been shown to influence employee productivity and retention.

We have discussed at length various employment-related aspects that are pertinent to livelihoods and productive professional careers. At this juncture, it is necessary to also direct attention to the exciting possibility of self-employment, personal enterprise and entrepreneurship. Self-employment and innovative entrepreneurial ventures can be challenging, stimulating and highly rewarding; hence they merit attention as an avenue for building satisfying careers.

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## Entrepreneurship

Entrepreneurship is the act of creating a new and innovative enterprise/ product or service. The function of entrepreneurs is to change the pattern of a production or design of a product through innovations / invention or even attempting new technological methods/modifications for producing a new commodity or producing an old one in a new way. An entrepreneur is a person who undertakes the creation of such changes in an enterprise or business. Entrepreneurs use their acumen to assemble resources and/ or finances and aim to make a livelihood. This may even result in new organisations or may be part of revitalising existing organisations.

An entrepreneur is a person who can take risks for converting a novel idea into reality. An entrepreneur is innovative, creative, organised, and risk taker. India has excellent examples of entrepreneurs who had the vision and thought e.g., Mr. Narayan Murthy, JRD Tata, Dhirubhai Ambani to name only a few.

Entrepreneurial activities differ depending on the type of organisation that is being started. Entrepreneurship ranges from small individual projects / micro units, sometimes involving the entrepreneur only part-time, to major undertakings which give jobs to many people in addition to the entrepreneur himself / herself. Many kinds of organisations now exist to support aspiring entrepreneurs, including government agencies, scientific institutes and organisations, financial institutions, such as banks and some voluntary organisations.

Entrepreneurs make things happen:

- May be a concept, product, policy or institution.
- They become champions of new process(es), engineers of change

## Characteristics of Entrepreneurs

An entrepreneur must necessarily have some personal attributes that enable him to take on the challenges of an enterprise. These include:

- Willingness to work hard
- Knowledge and skills for planning and implementation
- Skills of management of finances, materials, personnel and time

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- Having the courage to take calculated risks
- Ability and preparedness to handle many tasks simultaneously
- Ability to learn and acquire the necessary skills for the tasks at hand
- Ability to deal with tough issues and find the solutions
- Being realistic and not expecting easy solutions
- Ability to cope with set-backs, challenges and failures
- Ability to develop partnerships, and able networking
- Ability to negotiate, strategise and prioritise
- Being flexible and able to handle crises
- Have good communication skills.

In short, to achieve his / her objectives, the entrepreneur must be innovative, creative and goal-oriented. The entrepreneur must be ready to initiate direct action and be motivated to seek and adopt more effective means of doing things. Recently, more comprehensive and holisitic conceptualisations of entrepreneurship have emerged wherein entrepreneurship is seen as a specific mindset resulting in different forms of entrepreneurial initiatives such as social entrepreneurship and knowledge entrepreneurship.

Social entrepreneurship focusses on doing social good. The social entrepreneur aims to achieve large scale benefits through entrepreneurship for a specific group or to society at large. Generally, the social entrepreneur works for the benefit of the underserved, neglected, disadvantaged groups or individuals who do not have the financial resources to achieve the benefit by themselves. Social entrepreneurs are 'social catalysts', visionaries who create basic social changes and sustainable improvements. Such actions may have the potential to stimulate global improvements in their specifically selected areas, be it education, health care, economic development, the environment, the arts, or any other social field. The success of social entrepreneurship is ascertained not so much by the profits made but more by the social benefits and impact.

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**Activity 13**

Form groups of 6-8 children and organise a discussion in the groups about issues concerning unemployment. The discussion and presentation should focus on the following:

- Do you know anyone who is unemployed?
- How is that person's standard of living and state of mind affected by the fact that he/she is unemployed?
- Does he/she want to work?
- Is unemployment a problem in our country?
- What do you think are the main causes of unemployment in India?
- What does the government (locally and nationally) do about the problem?
- What other suggestions can you make to resolve this problem?

## Key Terms

Work, meaningful work, careers, livelihood, rest and recreation, standard of living, social responsibility, ethics, volunteerism, traditional occupations, age and gender, child labour, attitudes and approaches to work, life skills, work and dignity, quality of work life, job satisfaction, creativity and innovation, work environment, occupational health, entrepreneurship.



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# Notes

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# UNIT II

# NUTRITION, FOOD SCIENCE AND TECHNOLOGY

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Our life is centred around food. Food is more than a biological necessity. It contributes to our cultural identity, is a part of social and religious practices. Food also enables us to realise our creativity, is a symbol of hospitality, status and power, among many other things. Our food choices have far reaching effects. Food nourishes the body, promotes growth, enables it to function and builds resistance to infection. If we eat nutritious and wholesome food, our bodies can function optimally. Thus knowledge about food and nutrition is essential.

Food and Nutrition / Food Science and Nutrition is a broad domain consisting of several sciences that are distinct yet interrelated. As you know, nutrition influences our health, well being and quality of life. Are you aware that nutrition plays a significant role even before birth and that it affects the health of an individual throughout life? Have you ever thought of yourself as a biological being, that your body is made up of carefully arranged atoms, molecules, cells, tissues and organs? Every cell is regularly and continually replaced, some after a few days, some after months and some after years, although your external appearance may be relatively unchanged. For all these internal and external processes, nutrients are required and food is the source of these nutrients.

However, many people do not have the correct knowledge; some do not get adequate food to eat, some overeat, others have wrong food choices because of various reasons, thus leading to malnutrition. In India, the proportion of undernourished persons has been high, but in recent years, prevalence of overnutrition is gradually increasing and many people are now suffering from health problems such as obesity, heart disease, hypertension, diabetes. Infectious diseases still continue to take their toll. Nutrition is the cornerstone for promotion of health as well as prevention and management of numerous disease conditions. Trained dietitians/ medical nutrition therapists are required to give advice about diet and nutrition to the individual as well as the community. Trained public health nutritionists are required to tackle public nutrition and health problems at regional, national and international levels, for planning-implementing-monitoring-evaluating various strategies and programmes.

India is a major producer of fruits and vegetables, milk, etc., but almost 1/5th to 1/3rd of the produce is wasted. This calls for concerted action to prevent spoilage, preserve, process and convert foods into a variety of forms. Cost of production in India is less than in many other countries and foreign direct investment is high. Therefore, food processing industry has been termed as the 'sunrise sector' of the Indian economy. Simultaneously socio-economic and socio-cultural changes/transitions in the country have tremendously increased the demand for ready to eat and processed foods. Besides this, the increasing prevalence of disease has necessitated



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development of foods for managing disease conditions. This has increased the demand for trained personnel who can undertake development, manufacture and marketing of various processed foods.

Increasing number of persons travel outside the home daily for education, work, tourism. Also those who live in institutions of various kinds such as old age homes, hospitals, orphanages, school and college hostels, prisons, ashrams need to be fed daily. Nutritious, wholesome and safe food needs to be prepared and catered. This requires expertise which can be achieved through appropriate training. With increasing tourism, interest in ethnic foods and cuisinology, there is demand for qualified persons.

However, availability of foods with varying shelf life is not enough. Safety of the foods is crucial. 'Safety culture' of any organisation is important, be it food processing/manufacturing/catering industry. Indian government therefore has introduced several legislations and standards of food safety from time to time. Ensuring that all consumers have access to safe, good quality food, will require persons trained in food quality and safety.

The five areas dealt in this Unit will acquaint you with basic concepts in each of these areas, give you insights about the professions and the knowledge and skills you need to acquire for each of these.



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CHAPTER

2

# CLINICAL NUTRITION AND DIETETICS

## LEARNING OBJECTIVES

After completing this chapter, the learner will be able to:

- understand and describe the significance and scope of clinical nutrition and dietetics.
- describe the role and function of a dietitian/clinical nutritionist/ medical nutrition therapist.
- explain the knowledge and skills required for a career in clinical nutrition and dietetics.

## INTRODUCTION

*Nutrition* is the science of food, nutrients and other substances as well as their digestion, absorption and utilisation by the body. Nutrition is also concerned with the social, psychological and economic aspects of food and eating. It is well known that optimum nutrition is important for providing immunity and protection from infection, and to promote recovery from a variety of illnesses as well as managing chronic diseases. When nutrient intakes are inadequate, the body has difficulty in maintaining immune defences, healing wounds, utilising medications, supporting organ functions. Such persons may fall victims to additional complications. Nutrition is also important in disease states. In some diseases, nutrition plays a major role in management and treatment, and for some it

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complements the medical treatment. Nutritional status and support, prior to and after illness, play an important role in prognosis, recovery and even duration of hospitalisation. Also, illness and disease can result in nutrient imbalances even in a person who previously had good nutritional status. Thus health and nutrition are intimately interlinked. Poor nutrition not only leads to health problems but can also make existing problems worse. The specialised area of nutrition which deals with nutrition during illness is *'Clinical Nutrition'*. In recent times, this field is called Medical Nutrition Therapy.

## Significance

Nutritional care has gained importance worldwide, more so in recent times. Health problems/illness/disease and their treatment can affect nutritional status in a variety of ways: by impairing a person's ability to eat and/or swallow, by interfering with digestion, absorption and metabolism as well as excretion. Even if one function is initially affected, in some individuals, if the health problem intensifies, other body functions may be affected. Clinical nutrition focusses on the nutritional management of patients with established disease.

It must be borne in mind that function of any organ/tissue/system of the body can be affected due to disease, which can lead to minor and acute to major and sometimes, chronic or long lasting problems. In all these conditions, it is important to ensure that the person is adequately nourished and the person who delivers this service is a trained dietitian/ medical nutrition therapist/clinical nutritionist. The professional clinical nutritionist/dietitian uses a systematic and logical approach to the nutrition care process, focussing on each person/patient's unique needs and addresses them in an individualistic and holistic manner. The patient is the primary focus of the nutritional care process.

The 20$^{th}$ and 21$^{st}$ centuries have witnessed tremendous advances in the field of medicine and pharmacology, enabling us to control many communicable and infectious diseases. However, newer diseases such as HIV/AIDS have emerged. Prevalence of non-communicable diseases such as obesity, heart disease, hypertension and diabetes is not only increasing, but these are occurring at a much younger age. In fact, India is likely to be the diabetes 'capital' of the world. Further, older persons require special attention. Thus, the proportion of population which requiresnutritional care, support and diet counseling is increasing. The clinical nutritionist/medical nutrition therapist plays an important role in preventionof diseases and promotion of good health, besides recommending therapeutic diets for management of various diseases.

New scientific knowledge is being generated about physiological and metabolic disturbances in chronic and acute diseases; newer methods of



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nutritional assessment are being developed and adopted, newer techniques and supplements for nourishing the patient are being used. With advances in the food and pharmaceutical industry basic research in nutrition has shed light on the role of various nutrients and other substances such as nutraceuticals, phytochemicals / bioactive substances resulting in the growth of the discipline of clinical nutrition. Researchers and scientists continue to discover the role of individual nutrients ranging from a role in gene expression, metabolic regulation and in the prevention and treatment of disease. For example, antioxidants like beta-carotene, selenium, vitamin E and vitamin C, particularly from food, appear to have a protective role.

According to the FSSAI, foods for special dietary uses or functional foods or nutraceuticals or health supplements means foods which are specially processed or formulated to satisfy particular dietary requirements which exist because of a particular physical or physiological condition or specific diseases and disorders and which are presented as such, wherein the composition of these foodstuffs must differ significantly from the composition of ordinary foods of comparable nature, if such ordinary foods exist, and may contain one or more of the following ingredients, namely:

(i) plants or botanicals or their parts in the form of powder, concentrate or extract in water, ethyl alcohol or hydro alcoholic extract, single or in combination;
(ii) minerals or vitamins or proteins or metals or their compounds or amino acids (in amounts not exceeding the Recommended Daily Allowance for Indians) or enzymes (within permissible limits);
(iii) substances from animal origin;
(iv) a dietary substance for use by human beings to supplement the diet by increasing the total dietary intakes.

*Medical foods* are those products that are specially manufactured for persons with specific needs. Such foods are regulated and can be used only with a doctor's prescription for the specific dietary management of a disease or condition.

*Phytochemicals/Bioactive compounds* are non-nutrient constituents present in foods that have physiological or biological activity and influence health.

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## Basic Concepts

The dietitian/ medical nutrition therapist's role is to provide advice and translate technical information into dietary guidelines. They provide advice

to patients and if necessary, give prescriptions to healthy individuals at different stages of the life cycle, from the womb to the tomb (i.e., pregnancy, infancy and childhood up to old age) in order to help them maintain good nutritional status and remain healthy. Besides this, nutrition and diet therapy are used to improve the overall health of patients with a wide range of conditions. Examples of these conditions are diarrhea, vomiting, food allergies, anemia, fever, typhoid, tuberculosis, ulcers, hyperacidity and heart burn, epilepsy, gastrointestinal problems, AIDS, hypertension, cancer, osteoporosis, obesity, burns, metabolic disorders, including diabetes, and kidney, liver, and pancreatic disorders. Patients who are to undergo surgery also need pre and post operative nutritional intervention/ support. *Clinical Nutrition* and *Dietetics*, therefore, is concerned with nutritional requirements of patients suffering from different diseases and prescribing the right type of diet for them. The objectives of **diet therapy** are:

(i) promotion of recovery formulation of the diet to meet the needs of the patient taking into consideration her or his food habits.

(ii) modification of the existing diets to ameliorate the disease condition and to keep it under control;

(iii) correction of nutritional deficiencies; if any

(iv) prevention of short-term and long-term complications in case of chronic diseases;

(v) education and counselling of the patient regarding the need to adhere to the prescribed diet.

A dietitian also needs to look at the effect of illness on food acceptance and utilisation. Some of the factors that are considered include (a) nutritional stress (b) psychological stress (c) effect of illness on food acceptance and (d) acceptability of modified therapeutic diets.

Thus, *Nutritional care* during illness is an organised group of activities and consists of :

- Assessing nutritional status
- Diagnosis of nutritional problems
- Planning and prioritising nutrition intervention(s) to meet nutritional needs
- Monitoring and evaluating nutritional care outcomes and making changes if necessary.

The nutritional care process is applied to individuals or groups in any setting from healthy persons who are clients of fitness/wellness centres/ programmes, pregnant women, elderly persons, persons being treated for illness in private physicians' clinics to hospitalised patients, regardless of whether they are in municipal, government, charitable or private hospitals.

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A study of clinical nutrition and dietetics enables the professional to:

- Plan diets appropriately to meet the nutritional requirements at various stages of the life cycle.
- Modify diets in various disease conditions, keeping in mind the physical state, occupation, cultural, ethnic and socio-economic background, the treatment regimen and the individual's likes and dislikes.
- Plan diets for athletes/sports persons, for individuals in special situations such as nutrition in space, persons working in submarines, defence personnel, industrial workers, etc.
- Promote health and well-being of patients admitted to hospital or in outpatient clinics as well as in institutional settings.
- Manage food services in a variety of institutional settings such as old age homes, schools, orphanages etc.
- Help patients with chronic diseases such as diabetes and heart disease in management, to prevent complications and improve quality of life.
- Promote better health in the community and better efficacy of services in health care institutions/ establishments in terms of better patient care management, holistic care, and contribute to better survival and recovery.

Nutritional assessment is required to obtain information on the patient's nutritional status and nutrient needs. It involves:

- Obtaining detailed information on health, diet, personal and medication histories
- Anthropometric measurements
- Relating the information on laboratory and physical measurements with the above and the physician's diagnosis
- Interpreting all of the above to identify potential nutritional deficiencies and risk of future deficiencies.

It must be borne in mind that physicians are ultimately responsible for ensuring that all the patient's medical needs are met. Based on the doctors' diagnosis of the disease condition and the nutritional assessment done, the dietitian prescribes the diet, ensures provision of food in the hospital according to the diet restrictions and provides dietary counseling to the patient. For the implementation of the diet prescription, the physician relies on the dietitian/medical nutrition therapist. Today, the field of clinical nutrition has evolved into a practice that is increasingly incorporated into mainstream medical treatment and the deititian forms an integral part of the medical team.

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The dietitian has the primary responsibility for ensuring that the patient receives appropriate diet and optimal nutritional care, after assessing the nutritional status of the patients, analysing nutrient needs (nutritional requirements change in different illness/disease states) and developing the nutrition care plan by administering suitable regimens to patients who are hospitalised or counseling those in the outpatient department (OPD).

Both normal and therapeutic diets are planned to maintain or restore good nutrition in the individual. This is done by the medical nutrition therapist/dietitian taking into account the food pattern and frequency of intake of different types of food, diagnosis of disease and prescription given by the doctor, the health status and physical condition including ability to eat, chew, swallow, digest and absorb the food eaten, feeling of hunger, physical activity and life style, dietary and other supplements consumed, cultural/ethnic practices and religious beliefs.

Let us get acquainted with some basic terms used by clinical nutritionists and dietitians.

***Types of Diets*** **:** Any nutritional care plan involves providing for adequate intake of all nutrients vis-à-vis the requirements based on age, sex, physiological state, occupation and health status.

- A *standard, normal or regular diet* is one that includes all groups of foods and meets the needs of healthy individuals. However, in the hospitals a regular diet would be low in fried fatty foods, sweets, spices and condiments.
- *Modified diets* are those that are adjusted to meet the medical needs of a patient, which may involve one or more of the following: (1) change in consistency and/or texture (e.g., fluid and soft diets), (2) an increase or decrease in the energy intake, (3) include greater or lesser amounts of one or more nutrients e.g., increase in protein intake in case of surgery, lower protein intake in case of kidney failure, high or low in fibre, lower fat intake, restriction in sodium intake, restriction in fluid intake, restricted intake of certain foods as these may be rich in a non-nutritive dietary constituent e.g., spinach, because spinach is rich in oxalates, and (4) change in the number of meals, or modification in intervals of feeding or special plan for patients when route of feeding is altered.

***Changes in Consistency:*** Depending on the condition, patients may be advised liquid, soft or regular diet (i) *Liquid diets are* primarily fluid in consistency at room temperature. Also known as full fluid diets, these include foods which are free from fibre and are nutritionally adequate. The advantage is that the nutrients are easily absorbed if the gastrointestinal tract is functioning normally. Such a diet is advised for persons who are

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unable to chew or swallow normally. For example, coconut water, fruit juice, soup, milk, buttermilk, milk shakes, etc. A variation of this is also clear liquid diet, which is even more thin in consistency, e.g., clear soups or juices (without pulp), very light tea, etc. Clear liquid diet is prescribed just after surgery. However, the limitation is that it is not easy to meet the nutritional requirements of the person completely. (ii) *Soft diets* provide semi-solid foods that are lightly seasoned, do not contain much fibrous or gas forming foods. Such diets are easy to chew and digest. Examples of foods included in soft diets are *khichdi,* sago *kheer*, etc. Foods included should minimise the risk of indigestion, abdominal distention, nausea, cramping or any other gastrointestinal problems.

There are certain modifications we make even for normal adults in the older age group. This is called *mechanical soft* diet which includes soft, mashed and pureed foods for the elderly with problems in chewing. A soft diet, on the other hand, is a therapeutic modification. It is soft in consistency and includes only simple, easily digestible food with no harsh fibre, high fat or spicy foods. Such diets are given when rest to the digestive system is recommended.

***Feeding Routes:*** The best and most preferred way / route for feeding the patient is orally or by mouth. However, there are patients who may not be able to chew or swallow e.g., if the person is unconscious or if there is a problem with the esophagus. For such individuals there are two options (a) tube feeding which is introdussed through the nose into the stomach or (b) intravenous feeding. In tube feeding, nutritionally complete feeds are delivered through a tube. These are preferred over intravenous feeding which is introduced through the nose into the stomach as long as the gastrointestinal tract is functional and the person is able to digest and absorb whatever is fed. Intravenous feeding means that the patient is nourished with special solutions which are given through a drip in a vein.

***Prevention of Chronic Diseases:*** Besides being important for persons with disease, diet and good nutrition (as well as a healthy lifestyle) can control and delay the age of onset of chronic diseases. The foods we consume today, especially processed foods, contain many additives, are high in fat and/or sugar, often are prepared from highly refined foods and are therefore low in fibre and many other important constituents which confer health benefits. This is why we need help in making appropriate choices.

Can you identify the types of changes that have occurred in the diets of urban Indians over the past decade? It is seen that fat consumption has increased, refined sugar consumption has increased. There is a reduced intake of fibre as well as several vitamins and minerals. In non-vegetarian populations, consumption of animal protein has also increased.

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What are the consequences of these dietary changes? Broadly speaking, such changes have been associated with increased incidence of chronic diseases such as obesity, cancer of the colon, diabetes, cardiovascular disease and hypertension. For example, the increase in sugar and fat consumption, along with the decrease in fibre consumption and less physical activity, play a role in causing of obesity and diabetes. It has also been found that high consumption of highly salted convenience foods, processed foods with high sodium content, decreased intake of potassium-rich fruits, vegetables, grains and legumes, possibly low calcium intakes, less physical activity as well as stress are associated with increased risk of hypertension (high blood pressure).

Clinical nutritionists can play a very important role in preventing development of such problems by providing appropriate diet counselling and guidance. They can also be appointed for guidance to various groups such as schools and colleges, etc.

EXERCISE 1

Scientists have found connection between diet and disease. For example in a clinical study of 20,000 men, consuming fish once a week was linked to a 52 per cent reduction in the risk of sudden death from heart attack. Fish is high in omega-3 fatty acids, which are essential components of cells and can protect the heart from abnormal heart rhythm.

In another clinical study of more than 42,000 women, those who ate lots of fruits, vegetables, whole grains, low-fat dairy products, and only lean meats lived longer. High intake of fruits, vegetables, and legumes was associated with a lower risk of developing heart disease.

*What can you conclude about (a) role of the diet in disease causation? (b) role of the diet in disease prevention?*

## Preparing for a Career

The professional clinical nutritionist or dietitian must have:

- Knowledge of physiological changes in disease conditions, changes in RDAs/nutrient requirements in illness and types of dietary modifications required, traditional and ethnic cuisines.
- Skills in assessing nutritional status of patients using clinical and biochemical criteria, diet planning customised to requirements of individual patients and specific disease conditions, recommending and administering diets to patients, communication for diet counselling, adapting to cultural milieu, food taboos and overcoming fads/myths.

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It is absolutely essential to have knowledge (both theoretical and practical) of the subject areas of nutrition, food science, food composition, clinical nutrition and dietetics or the more recently used terminologies such as medical nutrition therapy or medical nutrition management. For this, the clinical nutritionist and dietitian needs to have thorough knowledge and understanding of the basic biological and physical sciences including chemistry, biology, physiology, biochemistry. Since food safety, especially in institutional settings, is critical, s/he must have knowledge of microbiology and food microbiology and safety, food quality and assurance, food laws and regulations, physics to be able to effectively use and ensure maintenance of the various equipments used in food preparation, storage and service. Knowledge of food service management including quantity food production is essential. Basic knowledge and understanding of bookkeeping and accounts, record–keeping, management, especially personnel management, are important. One of the most important aspects of the job profile of a dietitian is counselling patients. Disease changes the body and mind. It can have a major impact on both the physiological and mental/emotional condition of the body. Counselling is an art and a science. A dietitian requires knowledge of psychology, sociology, education and counselling in order to become a good diet counsellor.

Clinical nutritionists would need to have additional knowledge of epidemiology and the patterns of prevalence and incidence of nutritional disorders and diseases, skills in surveying patient populations, laboratory research using biochemical parameters, skill in conducting experimental research with patients to find out the usefulness of various diets, drugs and nutritional supplements.

## Preparing for a Career

In order to choose any of the career options offered by Clinical Nutrition and Dietetics, you need to have passed 10+2 level followed by completion of a B.Sc. degree in Home Science or B.Sc. with a specialisation in Nutrition / Food Technology. In case you want to be a dietitian you must at least complete a Postgraduate Diploma in Dietetics with an internship to qualify to be a registered dietitian. Those who have a B.Sc. degree in Home Science, Life Sciences, Biochemistry, Microbiology or Biotechnology can enter this area at the Postgraduate Diploma level. M.Sc. in Food Science and Nutrition or Dietetics helps one to specialise in this field and are preferred in many places of employment A dietitian, after finishing her/his university education, can go further and qualify to obtain the credential of a “Registered Dietitian”. Many countries have regulatory laws regarding this. If you choose a career focussing on teaching and research, a number of options open up in universities, colleges and research institutions. In order to qualify for teaching posts it is now essential to successfully clear



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the National or State Eligibility Tests conducted by University Grants Commission (UGC). It is advisable to complete your Ph.D. too in case you want to pursue a career in academics or research.

## Scope

Clinical Nutrition and Dietetics offers rich scope and potential for a satisfying career as a dietitian, diet counsellor, teacher, researcher or corporate consultant. The primary career and wellness possibilities in this field include becoming a dietitian, diet counsellor or clinical nutritionist engaged in research and/or teaching. Besides this, clinical nutritionists also have career opportunities in the food industry, research and development (R&D) and production of medical foods, nutraceuticals, tube feeds, various types of nutritional support formulations or functional foods.

If you have a keen interest in improving the way in which we use food to control, prevent and treat disease conditions, clinical nutrition and dietetics is the field you should choose. Clinical Nutrition and Dietetics has a promising future. While most of us have an idea of the role of dietitians and diet counsellors, we may not be aware that there is expanding scope for research into the physiological and psychosocial changes brought about by disease conditions. The relevance of nutritional considerations in preventing, treating and curing different types of disease conditions is being increasingly accepted. Research has led to the development of drugs and nutritional supplements, rehabilitation of patients in community settings; development of dietary guidelines and nutrition education.

Further, clinical nutritionist can have a role in delineation of public policy, in designing and implementing preventive and promotive nutrition programmes to tackle nutritional deficiency disorders. You could expect jobs as a dietitian in hospitals/ clinics, wellness centre, gyms, slimming clinics with consultants, teacher / faculty in a university or college, researcher in medical research establishments and nutrition research laboratories, consultant in companies developing therapeutic foods and supplements, food service manager/ provider in hospitals etc. You can also work as a freelancer, diet consultant or dietitian running your own enterprise.

**Career Avenues:**

- Dietitians with consultants/physicians, in health clubs or gymnasiums
- Dietitians in hospitals including speciality departments; a key member to provide nutrition support in the healthcare team



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- Freelance Dietitian.
- Dietitians in catering services for hospitals, schools, industrial canteens, etc.
- Entrepreneurs who develop and supply speciality foods for specific health purposes
- Teaching and Academics
- Research including Clinical Research
- Nutrition Marketing
- Technical Writing.

## KEY TERMS

Dietetics, clinical nutrition, dietary modification, therapeutic diets, dietitian, nutrition counselling.

## REVIEW QUESTIONS

1. What is the significance of the study of clinical nutrition and dietetics?
2. What are the types of dietary modifications that a medical nutrition therapist may make?
3. Why do we need dietary changes to prevent chronic diseases? How are they linked with lifestyle?
4. What are the roles performed by a dietitian? How does the dietitian form a team in patient care with other health care professionals?
5. How can we prepare for a career in clinical nutrition and dietetics?
6. How does illness/disease affect nutritional status of a person?

## PRACTICAL 1

**Theme:** Modification of a normal diet to soft diet for elderly person.

**Tasks:**

1. Interviewing and recording of one day's diet / food intake for an adult,
2. Assessing the diet to determine whether it is nutritionally balanced,

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3. Modifying the diet to suit the needs of an elderly person who needs a soft diet,
4. Assessing the modified diet to determine whether it is nutritionally balanced, and
5. Interacting with an elderly person to determine whether the modified diet is acceptable.

**Purpose:** This practical will enable students to understand the basic concepts of diet modification for a specific purpose and the importance of providing a well-balanced, nutritious diet, keeping in mind the age, sex and health status of the individual. It will also give them an opportunity to interview a person and recording diet intake.

### Conducting the Practical

**Note to the Teacher: The first part of the practical (Tasks 1 and 2) is to be done with an adult person within 60 years of age and the modification of the diet (Tasks 3, 4 and 5) has to be done for an elderly person, as given on page 68.**

This practical can be done individually or in pairs.

1. Each individual student/pair should interview an adult man or woman who is below 60 years of age, in your family or neighbourhood.
2. One day's diet, i.e. food intake including all liquids and beverages, are to be recorded in the format given herein. An example is given for your reference.
3. The diet should then be assessed to determine whether it is nutritionally well-balanced, using the guide given.
4. This diet should then be modified to a soft diet (easy to chew and swallow) for the following situations: **(Note to teacher: One case of the following to be assigned to each student/pair)**
   a) An elderly man/woman who has no teeth - age > 70 years
   b) An elderly man/woman who has no teeth and has difficulty in swallowing
   c) An elderly man/woman who has dentures ( age about 60-65 years)
   d) An elderly man/woman who does not have molar teeth.
5. Assess the modified diet to determine whether it is nutritionally balanced.
6. Interact with an elderly person in your family or neighbourhood.



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7. The diet plan is to be shared with them, and their comments and suggestions should be recorded

8. Teacher to facilitate a class discussion about the exercise.

**Record of 24-hour dietary intake**

| Time of Day | Meal | Menu Item | Ingredients | Amount consumed (in household measures) | Remarks* |
|---|---|---|---|---|---|
| Early morning | Bed tea | | | | |
| Morning | Breakfast | | | | |
| Mid morning | | | | | |
| Afternoon | Lunch | | | | |
| Evening | | | | | |
| Night | Dinner | | | | |
| At bed time | | | | | |

* Note any additional ingredients added e.g., sugar to milk, ghee on chapati or rice, supplement in milk, sugar or jaggery or honey eaten with bread or chapati, etc.

**Example for recording the food intake**

| Time of Day | Meal | Menu Item | Ingredients | Amount consumed (household measures) | Remarks* |
|---|---|---|---|---|---|
| Example<br>6.30 am | Bed tea | Tea | Milk<br>Sugar | 1 mug | 2 tsps sugar added |
| 7.30 am | Breakfast | Bread with omelette<br><br><br><br>Milk | Bread<br>Butter<br>Egg -1<br>Oil<br>Onion<br>Coriander<br>Milk | 2 slices<br>1 tsp<br>1 omelette<br><br><br><br>1 mug | <br><br><br><br>Sugar added 1 tsp<br>Supplement added (e.g.) 1 tablespoon |

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**Guide for assessing diet quality and whether the diet is nutritionally balanced**

| Food group | No. of servings consumed | No. of servings recommended | Difference between recommended and consumed |
|---|---|---|---|
| Cereals and Millets | | Approx 10 | |
| Pulses and Legumes | | 2–3 | |
| Green leafy vegetables | | ½ to 1 katori cooked | |
| Other vegetables | | 2 katoris[b] cooked | |
| Roots and tubers | | ½ to 1 katori | |
| Fruits | | 2-3 servings[A] | |
| Milk/milk products e.g., curd | | 1 glass / 1 katori | |
| Visible fats and oils including butter, ghee etc. | | 6 tsps* | |
| Sugar and jaggery | | 4 tsps* | |

**Note**: * The maximum desirable intake
(a) At least one of the fruits should be a source of vitamin C
(b) including salads

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CHAPTER

3

# PUBLIC NUTRITION AND HEALTH

## LEARNING OBJECTIVES

After completing this chapter the learner will be able to:

- understand the significance and scope of public nutrition.
- have knowledge about the nutritional problems of public health significance.
- be acquainted with the government programmes that are in operation to tackle important nutritional problems.
- describe the role and functions of a public health nutritionist.
- explain the knowledge and skills required for a career in public health nutrition.

## INTRODUCTION

In Class XI you studied the basic concepts of nutrition and health, physical fitness and wellness. You must be aware of the importance of good nutrition as the foundation and cornerstone of health. So what is significant about the introduction of the word 'public' in this context? Let us find out. You are already familiar with the definition of health given by the World Health Organisation. The concept of public health refers to the collective action taken by society to protect and promote the health of the whole populations.

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In Class XI, you were introduced to the terms undernutrition and overnutrition. The mission in public health nutrition is to prevent both undernutrition and overnutrition and to maintain optimal nutritional status of the population.

## Significance

Why do we need to focus on this specific aspect in the field of nutrition? Malnutrition is the underlying cause of at least 50 per cent deaths of children under five years of age. The statistics for nutrition-related problems in our country reveal an alarming situation:

- Almost one-fifth of the infants born in India are low birth weight babies i.e., they weigh less than 2500g or 2.5kg. Low birth weight may have adverse effects throughout their growing years and may have adverse implications even in adult life. Low birth weight may even lead to child mortality.
- There is widespread prevalence of growth retardation among pre-schoolers (from socio-economically disadvantaged families) and almost half the children suffer from mild and moderate under nutrition.
- A large proportion of children (and adults) suffers from micronutrient deficiencies in varying degrees of severity also known as hidden hunger. The micronutrients of most concern are iron, zinc, vitamin A, vitamin C, vitamin D, iodine, folic acid and B12.

If these problems are not controlled in time, they will not only affect physical growth which may lead to smaller body stature in adulthood, but may also affect mental and cognitive development. All of these, in turn, can have negative impact on productivity and quality of life. The costs of malnutrition are very high. Experts have estimated that productivity losses are more than 10 per cent of lifetime earnings for individuals and 2-3 percent of gross domestic product for the nation. This clearly indicates that if we tackle malnutrition, we can help India to develop, grow economically and become a powerful nation.

India mostly faces the problem of under nutrition; however, the problem of over nutrition is also on the rise. Gradually, over the years, large numbers of persons have altered their dietary patterns and lifestyles. With respect to lifestyle, people have become more sedentary, relying on faster means of transportation, walking less and doing less amount of physical activity. In large cities, even children do not play enough outdoor games. Simultaneously dietary patterns have become less 'healthful'. Food choices have become less 'healthy' because processed foods, fast foods,



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snacks, western type foods, e.g., burgers, pizzas, biscuits, chocolates, cakes and pastries, soft drinks, even Indian *mithais*, *samosas,* etc. (that are high in energy, sugar, fat, salt and low in other nutrients and fibre) are increasingly becoming part of the daily diet. At the same time, intake of whole grains, pulses, vegetables and fruits has reduced. All these lead to undesirable/inappropriate weight gain, overweight and obesity and ultimately lead to diseases such as hypertension, heart disease, diabetes, cancer, arthritis, among others. These diseases are non-communicable and take their toll not only on the physical health but also on quality of life, adding to the financial burden.

Thus India is said to face 'the double burden of malnutrition' i.e., coexistence of both undernutrition and overnutrition. Further, although communicable diseases like smallpox have been controlled, newer ones like HIV/AIDS and old ones like tuberculosis, hepatitis, malaria, are increasing in prevalence. The ultimate consequences of these communicable diseases are far worse for those who are not optimally nourished i.e., those who are undernourished and those who have lower immunity due to obesity, diabetes, HIV/AIDS, etc. This poses challenges for doctors, nutritionists and the government in terms of treatment, control and prevention.

There is a tremendous need for a trained cadre of public health professionals including public health nutritionists, to address and solve these problems. Let us first acquaint ourselves with what is public health nutrition.

## Basic Concepts

### What is Public Health Nutrition?

Public health nutrition is the field of study that is concerned with promotion of good health through prevention of nutrition–related illnesses / problems in the population, and the government policies and programmes that are aimed at solving these problems. Public health nutritionists / professionals use large scale, organised and multidisciplinary approaches to solve the problems that affect the population i.e., large number of people for whom group action is necessary. Therefore, this field is multidisciplinary in nature and is built on the foundations of biological and social sciences. It differs from other fields of nutrition e.g. clinical nutrition and dietetics, because the professionals are required to address problems of the community / public specially the vulnerable groups. Public Nutrition is a special body of knowledge derived from the nutritional, biological, behavioural, social

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and managerial sciences. It can also be described as the art and science of promoting health and preventing diseases, prolonging life, through the organised efforts/action of society.

A **community** is a specific group of people who share common characteristics, e.g. a common language, exposed to similar conditions, common lifestyle or the same health problem.

Any professional in the field of public nutrition has to promote good nutrition and /or to prevent nutritional problems, for which it is important to identify the problem and its magnitude , understand how and why these problems occur and then plan strategies and actions to implement them and evaluate their impact.

In any society, nutritional problems are not just linked to food but to a variety of interacting/interrelated factors at various levels which have been summarised in Figure 3.1. While poverty is often the underlying cause, the situation becomes worse when a substantial proportion of families do not have access to basic amenities. Rural households have less access to toilets. Poor sanitation results in loss of work days and further economic loss. Further, considerable proportion of the population does not have safe drinking water. Working days are lost each year due to water borne diseases.

As shown in Figure 3.1, the factors related to nutritional problems range from economic factors (availability of financial resources), agricultural policy (production, price of various food stuffs), health care facilities/ services, their availability and access to the government policies, political will and socio-cultural factors.

*Nutritional Problems in India*: It is important to have knowledge about the nutritional problems in our country.

Let us discuss these in brief:

a) *Protein- Energy Malnutrition(PEM)* : Can be found in every society, even in developed and industrialised countries, although the numbers are fewer in the latter as compared to developing countries. It is caused by inadequate food intake vis–a–vis the requirements, i.e., insufficient intake of the macronutrients (energy and protein). Children are at greatest risk although PEM can occur in adults especially the elderly, as well as in some diseases e.g. T.B., AIDS, etc. It is assessed by evaluating the anthropometric measurements (weight, height, head-chest circumference, etc.).



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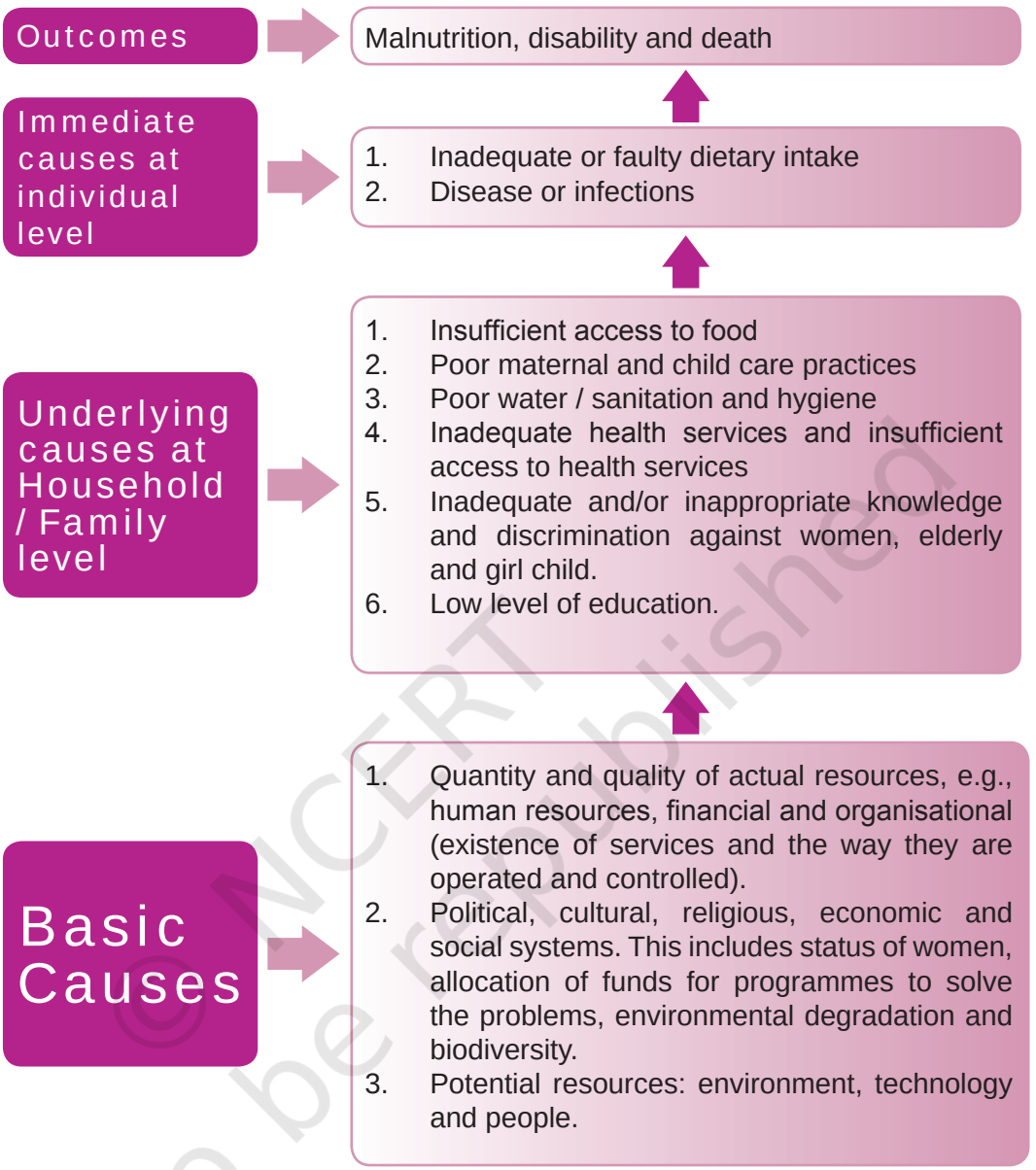


***Fig. 3.1: Factors Related to Undernutrition***

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A person is said to be underweight when his/her body weight is less than adequate for his/her age. Stunting (short stature) is said to be present when the height is less than adequate for age. When weight is not adequate relative to height, it is termed 'wasting'.

Severe undernutrition due to deficiency of food and energy is termed as 'marasmus' and that caused by protein deficiency is termed 'kwashiorkor'.

b) *Micronutrient deficiencies*: If the diet is deficient in energy and protein content it is also likely to contain inadequate amounts of other nutrients especially micronutrients viz. minerals and vitamins. The term "hidden hunger" is used to refer to micronutrient deficiency. The deficiencies of iron, vitamin A, iodine, zinc are of major public health concern. In addition, there is growing concern about deficiency of vitamin B12, folic acid, calcium, vitamin D and riboflavin. Some micronutrient deficiencies of public health concern are described below:

*Severely marasmic infants in Tripoli, Libya, weighing 3.8 kg at 12 months and 2.25 kg at 4 months, respectively.*

(a) (b)

***Victims of (a) Protein Energy Malnutrition and (b) Micronutrient Deficiency***

*Source: SIGHT and LIFE, Basel, Switzerland*

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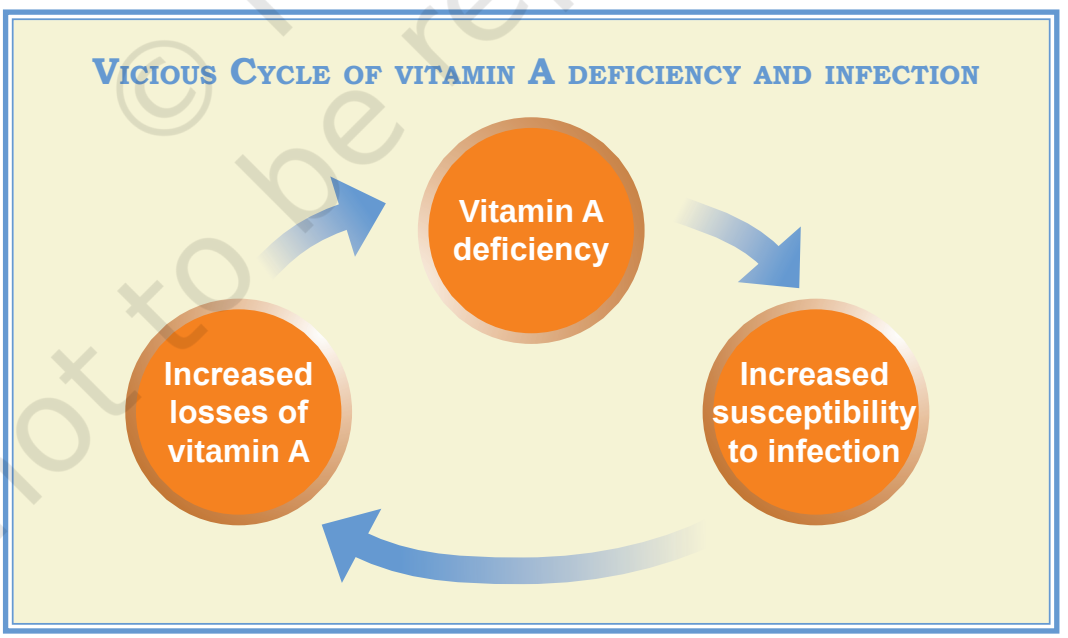
(i) *Iron-deficiency anemia (IDA)*: It is the most common nutritional disorder in the world and is prevalent in both developed and developing countries. The vulnerable groups are women in child–bearing age, adolescent girls, pregnant women and school age children. IDA occurs when hemoglobin production is considerably reduced and it results in low levels of hemoglobin in blood. Symptoms depend on the rate of fall in hemoglobin. Since hemoglobin is required for carrying oxygen in the body, any physical exertion leads to shortness of breath (breathlessness on slight exertion) and the person complains of fatigue and may feel lethargic. Manifestations of IDA include general pallor, paleness of conjunctiva of eyes, tongue and nail beds and soft palate. In children, cognitive functions (attention span, memory, concentration) are adversely affected.

(ii) *Vitamin A deficiency* (VAD): Vitamin A is necessary for maintenance of healthy epithelium, normal vision, growth and immunity. Deficiency of vitamin A results in night blindness which progresses to complete blindness if corrective measures are not taken. Also, there is less resistance to infection and growth may be adversely affected. There is a vicious cycle between vitamin A deficiency and infection. Vitamin A deficiency is the most common cause of childhood blindness.

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(iii) *Iodine deficiency disorders* (IDD): Iodine is required for normal mental and physical growth and development. IDD is an ecological phenomenon, largely due to deficiency of iodine in the soil. Some of the states in India where IDD is common are– Jammu and Kashmir to Arunachal Pradesh in the Himalayan belt, Andhra Pradesh, Karnataka, Kerala, Maharashtra and Madhya Pradesh. The term '*Iodine Deficiency Disorders*' refers to a spectrum of disabling conditions that affect the health of humans, from fetal life through adulthood due to inadequate dietary intake of iodine. Deficiency of iodine results in insufficient amount of thyroid hormone which is synthesised by the thyroid gland.

Enlarged thyroid known as 'goitre' is the most common manifestation of iodine deficiency in adults. In children it manifests as cretinism. Iodine deficiency in adults during pregnancy has several adverse effects specially resulting in mental retardation and congenital abnormalities of the fetus. Unfortunately this effect is irreversible. IDD is estimated to affect about 13 per cent of the world's population and about 30 per cent are at risk.

**Strategies/intervention to tackle Nutritional Problems**

As our former Prime Minister Dr. Manmohan Singh stated in one of his speeches "*The problem of malnutrition is a matter of national shame …… I appeal to the nation to resolve and work hard to eradicate malnutrition in 5 years*". There is a need to adopt a multi-disciplinary approach to solve nutritional problems. Government is making considerable efforts to solve the problems. POSHAN Abhiyaan or the PM's Overarching Scheme for Holistic Nutrition was launched in Jhunjhunu, Rajasthan in March 2018. It targets stunting, under-nutrition, anaemia (among young children, women and adolescent girls) and low birth rate. It is meant to monitor and review the implementation of all such schemes. Its large component involves gradual scaling-up of interventions to all districts in the country by 2022. The Ministry of Women and Child Development (MWCD) is implementing POSHAN Abhiyaan in 315 districts in the first year, 235 districts in the second year and remaining districts will be covered in the third year. Through robust multi-ministerial convergence mechanism and other components POSHAN ABHIYAN strives to create the synergy. Some direct short term interventions are: (a) Integrated Child Development Services (ICDS )to cover all vulnerable children in the age group of 0-6 years and all pregnant and lactating mothers, (b) fortification of essential foods (salt fortified with iodine), (c) production and popularisation of low cost nutritious foods from indigenous and locally available raw material by

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involving women in this activity and (d) control of micronutrient deficiencies among vulnerable groups, namely deficiencies of iron, vitamin A, folic acid and iodine among children, pregnant women and nursing mothers by supplementing these nutrients, distributing free tablets, etc.

Indirect policy instruments include long term strategies for achieving national goals through indirect institutional or structural changes such as: (a) ensuring food security i.e., improving availability of food, (b) improvement in dietary patterns by ensuring availability of nutritionally rich foods and (c) poverty alleviation for rural and urban poor through employment generation schemes and public distribution system, implementing land reforms, improving health and family welfare, prevention of food adulteration, involvement of media, basic nutrition and knowledge, monitoring of nutrition programmes, improvement of status of women, education and literacy and community participation.

There are various strategies that can be used to combat public nutrition problems. They are broadly classified as:

a) Diet or food-based strategies

b) Nutrient-based approach or medicinal approach

*Diet or food-based strategies*: They are preventive and comprehensive strategies that use food as a tool to overcome nutritional deficiencies. They can play an important role in preventing micronutrient deficiencies by increasing the availability and consumption of micronutrient-rich foods. One of the important advantages of this strategy is that it is sustainable and will have long-term benefits. Other benefits are that they are cost-effective, can be adapted to different cultural and dietary traditions and very importantly they do not carry risk of overdose or toxicity which may happen in case of nutrient–based / medicinal approach. Some important food-based approaches include dietary diversification and modification, horticulture interventions e.g., home gardening, nutrition and health education, food fortification.

*Nutrient-based or medicinal approach* : In this approach nutrient supplements are given to vulnerable groups i.e., those who are at risk of deficiency and those who have deficiency. It is a short term strategy particularly used for vitamin A, iron and folic acid in India. Supplementation programmes are often expensive and there may be problems of coverage. Key target groups are different for various nutrients.

Table 3.1 compares the two approaches. It must be remembered that the long-term goal should be to shift away from supplementation towards food-based approaches.

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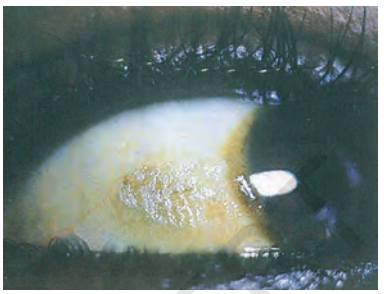
***Providing nutritious food***

*Source: SIGHT and LIFE, Basel, Switzerland*

***Child with Vitamin A deficiency***

*Source: SIGHT and LIFE, Basel, Switzerland*

***Yellow, green & orange fruits and vegetables are good source of Vitamin A***



***Vitamin A deficiency picture of eye***

***Iron and Folic acid drops***

***Weighing of a Child***

***Counselling with mothers***

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**Table 3.1: Different Interventions for Tackling Malnutrition**

| Intervention | Appropriate for | Advantages | Challenges/ Disadvantages |
|---|---|---|---|
| **Medicinal or Nutrient Based** | | | |
| Nutrient Supplementation | Therapeutic treatment<br>Prevention programmes for specific nutrient and specific target groups | Timely<br><br>Sustainability | More costly than other measures<br><br>Narrow scope of coverage |
| **Food Based or Diet Based Strategies** | | | |
| Fortification (fortifying food with nutrients) | Prevention (Universal /For all) | Highly cost-effective<br>Wide coverage<br>Sustainable | Requires research<br>Participation of food industry<br><br>Does not lead to awareness in the population about the importance of nutrition and nutrients<br><br>Does not lead to long-term dietary/ behavioral changes |
| Dietary Diversification | Prevention (Universal /For all) | Highly cost-effective<br><br>Wide coverage<br>Sustainable<br><br>Provides many micronutrients simultaneously<br><br>Improves food security | Requires changes in eating behaviour<br><br>Requires economic development to be feasible<br><br>Requires change in agricultural policies |

*Adapted from: Public Nutrition (Course Material) published by Indira Gandhi Open University*

Let us enlist the Nutrition programmes operating in our country:

1. ICDS: It is an outreach programme for early childhood care and development, covering pregnant and nursing mothers and infants and young children upto 6 years.

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2. Nutrient Deficiency Control programmes, namely, National Prophylaxis Programme for Prevention of Blindness due to Vitamin A deficiency, National Nutritional Anemia Prophylaxis programme, National Iodine Deficiency Disorder Control Programme,
3. Food Supplementation Programmes like the Mid-Day Meal Programme,
4. Food Security Programmes, namely, Public Distribution System, Antodaya Anna Yojana, Annapurna Scheme, National Food for Work Programme, and
5. Self-employment and wage employment schemes.

Self-employment and wage employment are social safety net programmes.

**Health Care:** Health is a fundamental human right. It is the responsibility of the government to provide adequate health care to the citizens. Health care is not just medical care but it includes a multitude of services that should help to promote, maintain, monitor or restore health. In India, health care is provided at three levels : primary, secondary and tertiary. Primary level is the first level of contact of the individual, family or community with the health system. In our country, these services are provided through a network of primary health centres (PHCs).

More complex health problems are resolved at the second level through district hospitals and community health centres. Community health centres function as the first referral level. Tertiary is the third and the highest level of health care. It deals with the more complex health problems that cannot be dealt with at the first two levels. Institutions at tertiary level are medical college hospitals, regional hospitals, specialised hospitals and All-India Institutes of Medical Sciences.

## Scope

*Role of Public Nutritionist*: Nutrition is an important determinant of health. The changing health scenario globally has increased the challenges for public nutritionists. The public nutritionist (also called community nutritionist), who is well trained and equipped in key areas, is eminently suited to participate in all the strategies of health promotion and prevention. The key areas include nutritional science, nutritional needs throughout the life cycle, nutritional assessment, nutritional care, food science, educational methods, mass media and communication and programme management. A community nutritionist can work in the following areas/situations.



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(a) As a part of outreach programmes undertaken by hospitals for prevention and promotion and education.

(b) As a part of the national Integrated Child Development Services, at different levels based on qualifications and expertise.

(c) At the government level as consultants, advisors, or in policy making committees.

(d) In all developmental programmes of government, voluntary organisations, NGOs and international organisations like UNICEF, USAID, GAIN, Nutrition International, TATA Trust, IFPRI and others are numerous other national and regional organisations.

(e) They can be involved with organisations who undertake large scale feeding programmes for various target groups such as young children, school children, adolescents, pregnant and lactating mothers, elderly, challenged individuals.

(f) Nutritionists or school health counsellors in school health programmes.

(g) They can be involved with corporate CSR programmes dealing with food and nutrition security to vulnerable groups.

Besides this, there are avenues in teaching, research, entrepreneurship with agencies involved in developing communication materials and educational packages for those who have adequate and appropriate training.

**ACTIVITY 1**

School to organise visit to Anganwadis (ICDS centres). Students can interact with supervisor (if possible) or sevika, observe the activities (if possible, be present when the food is distributed) and prepare a power point presentation about the same.

**ACTIVITY 2**

School to organise an interactive session with medical officer /health in charge of PSM dept / PHC / Municipal Corporation about the problems of undernutrition and its the possible causes.

**ACTIVITY 3**

School to organise an exhibition on nutritional problems in India, their causes, vulnerable groups and simple preventive measures.

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**Activity 4**

Log on to the websites of WHO, UNICEF, Poshan Abhiyaan, Ministry of Health and Family Welfare and Ministry of Women and Child Development to learn more about their programmes and activities.

### Career Avenues

- Community nutritionist in PSM departments of hospitals
- Nutrition programmes of the government. e.g., ICDS, Food and Nutrition Board
- In voluntary organisations (regional, national and international) as nutritionists
- As consultants
- Nutritionists or counselors for schools, industries, etc.
- Teaching and academics
- Research

## Key Terms

Nutritional status, undernutrition, malnutrition, public health, public nutrition, nutrition programmes, community health.

## Review Questions

1. Explain the terms: Stunting, low birthweight baby, IDD, wasting, 'double burden of malnutrition', marasmus, kwashiorkor, community.
2. Discuss the various strategies that can be adopted to combat public nutrition problems.
3. What is public health nutrition?
4. What are the common nutritional problems facing India?
5. What are the consequences of IDA and IDD?
6. What is the scope of public health nutrition? List some of the career choices in this area.

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## PRACTICAL 1

**Theme:** Development and Preparation of Supplementary Foods for Nutrition Programmes

**Tasks:**

1. Obtaining the prices of commonly consumed, locally available foods
2. Planning of low-cost recipes for supplementary food for preschoolers attending an *Anganwadi.*
3. Preparation of selected recipes
4. Evaluation of the prepared recipes

**Purpose :** This practical will provide insights to the students into planning, costing and preparation of supplementary foods for preschoolers within a given budget.

### Conducting the Practical

1. Divide students into 4 groups
2. The groups should plan the recipes to provide selected nutrients as follows:

   Each group should plan 2 recipes and calculate the cost using the price list. Plan should be made for 5 servings.

   Group A: To plan recipes that will be good sources of energy and protein

   Group B: To plan recipes that will be good sources of iron

   Group C: To plan recipes that will be good sources of vitamin A or Beta carotene

   Group D: To plan recipes that will be good sources of calcium

   **Note: Students are not required to calculate the nutritive values/nutrient content of the recipes**

   A cost limit is to be given by the teacher (Not more than ₹ 5 per serving).
3. Each group should identify the possible locally available food sources for the specific nutrient for which they have to plan the recipes.
4. The planned recipes should be checked by the teacher and one suitable recipe should be selected for preparation.
5. The product should be prepared in class and evaluated for (a) serving size, (b) cost (c) suitability for preschoolers (d) appearance (e) taste (f) acceptability by children.
6. Observations and comments should be recorded and suggestions given for improvement.

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CHAPTER

4

# FOOD PROCESSING AND TECHNOLOGY

## LEARNING OBJECTIVES

After completing this chapter the learner will be able to:

- understand what is food processing and technology, its history, development and present status
- explain the significance and basic concepts of the subject
- be aware of the skills required to be a professional food technologist
- be aware of the career opportunities available and educational qualifications required for specific careers in the industry
- know the scope for self employment as small, medium or large scale entrepreneurs.

## INTRODUCTION

Food items are being processed for various reasons. Since times immemorial, grains have been dried after harvest to increase their shelf life. Initially, foods were processed primarily to improve digestibility, palatability and to ensure a continuous supply. In India pickles, *murabbas* and *papads* are examples of preserved products made from certain vegetables/ fruits/ grains. With passage of time, improved transportation, communication and increasing industrialisation, the needs of consumers have become

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more diverse and there is now increasing demand for 'fresh' and 'organic' foods, 'safer and healthier' foods and foods with adequate shelf life. Consumers expect better-quality foods with retention of nutrients, many a time having specific functional properties and taste/texture/consistency, while being shelf-stable and easy to package, store and transport. This has served as a stimulus to scientists to develop methods and techniques to process foods in a manner that the food products will meet the requirements and demands of the consumers. All of us eat readymade foods. These range from biscuits, bread, pickles/papads to foods such as ready-to-eat curries, meal items, snacks, etc. Such foods are manufactured using a variety of processes and technologies. For some, simple traditional methods are still used while newer processes and technologies are employed to produce processed foods in bulk.

**Significance:** India has progressed from an agro-deficit to an agro-surplus country creating need for storage and processing of agricultural and horticultural produce. Indian food industry has thus emerged as a major producer of processed foods and ranks fifth in terms of size, contributing nearly 6 per cent of GDP. Besides, changes in lifestyle, increasing mobility and globalisation have increased the demands for various types of products, making the research for newer technologies necessary. It is well known that simple diets based largely on staple foods such as cereals are often deficient in certain nutrients leading to their deficiency disorders. Therefore, *food fortification* is done by adding the nutrient that is lacking in the food stuffs or condiments to ensure that minimum dietary requirements are met. Some examples are iodised salt, folic acid added to flour, vitamin A and D added to milk and oils/fats. In fact, FSSAI has laid down standards for fortification of staple food like salt, wheat flour, milk and oats. Increasing prevalence of diseases like heart disease and diabetes and concern about wellness, has made it necessary for scientists to alter the nutrient content of foods, for example reducing the Calorie content of processed foods in several ways such as using artificial *sweeteners*. Likewise fat from ice creams is replaced by specially treated proteins which give ice cream the smooth texture associated with fat but the energy value is reduced. Also, consumer perceptions about food have changed. The demand for foods free of chemicals, pesticides and preservatives, yet having a longer shelf life and retaining their natural flavour and appearance, is rapidly increasing. All this has increased the importance of food processing and technology as a discipline and there is a huge demand for food technologists.

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# Basic Concepts

*Food Science:* It is a distinct field involving the application of basic sciences such as chemistry and physics, culinary arts, agronomics and microbiology. It is a broad discipline concerned with all the technical aspects of food, beginning with harvesting or slaughtering and ending with cooking and consumption. Food Scientists have to use the knowledge of biology, physical sciences and engineering to study the composition of foods, changes that occur at various stages from harvest through different processes and storage, causes of their spoilage and the principles underlying food processing. Food scientists deal with physico-chemical aspects of food, thus helping us to understand the nature and properties of food.

*Food Processing*: It is the set of methods and techniques used to transform raw ingredients into finished and semi-finished products. Food processing requires good quality raw materials from either plant and/or animal source to be converted into attractive, marketable and often long shelf-life food products.

*Food Technology*: Technology is the science and application of scientific, as well as socio-economic knowledge and legal rules for production. Food technology uses and exploits knowledge of Food Science and Food Engineering to produce varied foods. Study of Food Technology gives in-depth knowledge of science and technology, and develops skills for selection, storage, preservation, processing, packaging, distribution of safe, nutritious, wholesome, desirable as well as affordable, convenient foods. Another significant aspect of food technology is to promote sustainability to avoid waste and save and utilise all the food produced and ensure safe and sustainable processing practices.

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*Food manufacturing*: It is the mass production of food products using principles of food technology to meet the diverse needs of the growing population. Food manufacturing is one of the largest manufacturing industries in the present times.

**Development of Food Processing and Technology**

Research in the field of Food Technology has been conducted for decades. In 1810, development of the canning process by Nicolas Appert was a decisive event. Canning had a major impact on food preservation techniques. Later Louis Pasteur's research, in 1864, on spoilage of wine and his description of how to avoid spoilage was an early attempt to put food technology on a scientific basis. Besides wine spoilage, Pasteur conducted research on production of alcohol, vinegar, wines, beer and souring of milk. He developed 'pasteurisation'- the process of treating milk to destroy disease producing organisms. Pasteurisation was a significant advance in ensuring microbiological safety of food.

Food Technology was initially used to serve military needs. In the 20th century, world wars, exploration of space and the rising demand for varied products from consumers contributed to the growth of Food Technology. Products such as instant soup mixes and ready-to-cook items including meals were developed, specially catering to needs of working women. Further, food industry was compelled to focus on nutritional concerns. Food preferences and choices changed and people started incorporating into their diet food items/preparations from different regions and countries. The desire to have seasonal foods all year round increased. Food technologists made efforts to provide both safer and fresher food using new techniques. In the 21st century, food technologists are challenged to produce foods suitable for health and other changing needs of consumers. Food technology has provided a vast variety of safe and convenient foods. In developing countries this rapidly expanding and developing field, has

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been helpful in improving food security and has opened avenues for employment at all levels.

**Importance of Food Processing and Preservation**

It has already been mentioned that food processing is a branch of manufacturing wherein raw materials are transformed into intermediate foodstuffs or edible products through the application of scientific knowledge and technology. Various processes are used to convert bulky, perishable and sometimes inedible food materials into more useful, concentrated, shelf-stable and palatable foods or potable beverages. Changes in the products often reduce preparation time for the cook. Most of the time, processing of foods adds value to the resultant product by increasing storability, portability, palatability and convenience. Professionals in the food processing need to be knowledgeable about general characteristics of raw food materials, principles of food preservation, processing factors which influence quality, packaging, water and waste management, good manufacturing processes and sanitation procedures. Let us briefly examine the need, principles, methods and modernisation of food processing.

Foods are subject to physical, chemical and biological deterioration. Food deterioration is associated with spoilage, development of off-flavors, deterioration of textures, discoloration and loss of nutritional value in varying degrees, reducing aesthetic appeal and rendering it unfit/unsafe for consumption. A number of factors can lead to food deterioration or spoilage e.g. pests, infestation by insects, inappropriate temperatures used for processing and/or storage, excessive exposure to light and other radiations, oxygen, moisture. Food is also contaminated by micro organisms [bacteria, fungus and moulds) or chemicals such as pesticides. Food can also be spoiled due to degradation by naturally present enzymes (a specific class of protein molecules that act as biological catalysts to accelerate chemical reactions). In addition, physical and chemical changes in certain constituents of food from plant and animal sources occur soon after harvesting or slaughtering, altering the food quality.

Therefore food processing and preservation are required to preserve food in edible and safe form. Methods by which food is preserved from spoiling after harvesting or slaughtering date back to prehistoric times. The oldest methods were sun drying, controlled fermentation, salting/pickling, candying, roasting, smoking, baking and using spices as preservatives. These tried and tested techniques are still used although, with the advent of industrial revolution, new methods have been developed. Food processing incorporates and unifies the general characteristics of different classes of foods and principles of food science, chemistry, food microbiology,



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nutrition, sensory analysis and statistics including good manufacturing practices as per regulations.

**Classes of Foods Based on Perishability**

Perishable foods are foods that spoil quickly within one or two days e.g., milk, curds, fish and meat.

Semi perishable foods can last for 1–2 weeks. Examples are fruits and vegetables. Root crops like onions and potatoes last for 2–4 weeks.

Non-perishable are those foods that generally last for one year e.g., grains like rice, wheat, pulses and dals, oilseeds.

Many food processing operations are designed to extend the shelf life of the food products. The concepts associated with food processing are reducing/eliminating microbial activity and other factors that influence food spoilage. The principle micro organisms that cause food spoilage are bacteria, fungi, yeasts and moulds. Just recollect that you studied in biology how they grow typically very rapidly under congenial conditions. Factors influencing microbial growth are nutrient availability, moisture, pH, oxygen levels and the presence or absence of inhibiting substances e.g. antibiotics. The activity of enzymes inherently present in foods also depends on pH and temperature. Oxidative enzymes in fresh fruits and vegetables continue to use oxygen to metabolise, reducing the shelf life of fruits and vegetables. So the basic concepts in food processing methods to prevent food spoilage are:

1. Application of heat,
2. Removal of water moisture,
3. Lowering of temperature during storage,
4. Reduction of pH,
5. Controlling the availability of oxygen.

**Did You Know?**

- *Bacteria prefer protein rich foods e.g. meat, fish, poultry, eggs, and dairy products. These are known as* ***High Risk Foods****.*
- *Bacteria grow at any temperature between 5–60$^0$ C. This temperature range is known as the* ***Danger Zone****.*

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Processed foods can be classified on the basis of extent and type of processing as follows:

1. *Minimally processed foods:* These are processed as little as possible in order to retain the quality of fresh foods. Generally the processes used are cleaning, trimming, shelling, cutting, slicing and storage at low i.e., refrigeration temperatures.
2. *Preserved foods:* The methods of preservation used do not change the character of the product substantially e.g., frozen peas and frozen vegetables, dehydrated peas, dehydrated vegetables, canned fruits and vegetables.
3. *Manufactured foods:* In such products, the original characteristics of the raw products are lost and some basic methods of preservation are used, often using various ingredients such as salt, sugar, oil or even chemical preservatives. Examples are pickles, jams, marmalades, squashes, papads, wadis.
4. *Formulated foods:* These are products prepared by mixing and processing of individual ingredients to result in relatively shelf-stable food products such as bread, biscuits, ice cream, cakes, kulfi.
5. *Food derivatives:* In industry, components of foods may be obtained from the raw product through purification, e.g., sugar from sugarcane or oil from oil seeds. In some cases, the derivative or the component may be processed further, e.g., conversion of oil to vanaspati (the process is called hydrogenation).
6. *Functional foods:* These are foods that can have a beneficial effect on human health, e.g., probiotics.
7. *Medical foods:* These are used in dietary management of diseases, for example, low sodium salt, lactose–free milk for persons with lactose intolerance.

**Activity 1**

- In your region / community, list the foods that are preserved at home and identify the method and preservatives used for preservation.
- Identify the processed food made using artificial sweeteners that are available in your area.

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Professionals who are involved in food processing and technology need to have a wide range of knowledge and skills. Table 5.1 shows categorisation of food production in three stages and lists the knowledge and skills required for each:

1. Food as a material
2. Food Product development
3. Recipe development

**Table 5.1 Knowledge and Skills needed for Food Processing and Technology**

| Food as a material | Food Product Development | Recipe Development |
|---|---|---|
| • Seasonal availability of food stuffs<br>• Nature and properties of food<br>• Nutritional content and its analysis<br>• Cost of food stuff<br>• Influence of chemical pesticides,time, moisture, temperature and additives<br>• Assessment of the quality of raw foods and ingredients for quality production of food<br>• Food Hygiene and Food Safety<br>• Knowledge of Information Technology for contemporary food production | • Knowledge of food preparation and cooking skills for large scale food production<br>• Knowledge of product specifications, and testing it<br>• Observing and measuring Quality Control as per specifications<br>• Assessment by sensory methods [by testing and tasting produced foods]<br>• Industrial practices and manufacturing systems and their control<br>• Labelling and packaging of marketable product<br>• Hazard Analysis and Critical Control point. {HACCP} | • Expertise in cooking<br>• Knowledge of nature and properties of food<br>• Uses of ingredients, measuring and weighing them accurately<br>• Designing, analysing and adapting a basic recipe<br>• Food handling skills<br>• Food production following hygiene and safety norms<br>• Handling tools and equipment accurately<br>• Innovations in product design and preparation according to consumer perceptions<br>• Use of Information Technology for contemporary production |

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# Preparing for a Career

Food industry is involved in processing/manufacture, research and development (modifying existing food products, developing new products, researching consumer markets and developing new technologies), ensuring food safety and monitoring food quality, improving quality control procedures, costing to ensure profitable production, and regulatory affairs. They may specialise in a particular branch of food technology such as beverages, dairy products, meat and poultry, sea food, fats and oils, stabilisers/preservatives/colours, food grains and additives. A professional in this area requires knowledge and skills about:

- Food science, food chemistry, microbiology, food processing, safety/quality assurance, good manufacturing practices and nutrition.
- Analysis of raw and cooked/manufactured foods for composition, quality and safety.
- Food ingredients, their uses in food preparations and food production on a large scale.
- Product specifications and food product development.
- Sensory evaluation and acceptability.
- Industrial practices, systems control, distribution channels, consumer purchase patterns.
- Food packaging and labeling.
- Ability to use information technology to support product design.
- Skills in food preparation and cooking.
- Ability to design, analyse, follow a design brief and adapt recipes.

After successful completion of 10+2 or equivalent examination, one can pursue short term certificate, craft and diploma courses at various institutes/colleges in different states, as well as at the Central Food Technological Research Institute [CFTRI], Mysore. Such courses are suitable for self-employment and for placement in small scale units of food preservation and processing, and catering establishments. Bachelor's and Master's degrees and research qualifications provide the most comprehensive grounding for jobs in the food industry, particularly large scale units, and for taking up research and training as well as entrepreneurship. Many universities in India and abroad offer graduate and post graduate degrees in the food technology. There are institutes offering post graduate courses in specialised aspects of Food Processing and Technology like National Institute of Food Technology and Entrepreneurship Management (NIFTEM) at Sonepat.



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## SCOPE

The demand for processed, packed and convenient food with prolonged shelf life requires well-trained human resource in the food industry. There is an encouraging, challenging and rewarding future for professions and careers in Food Technology and Food Processing industry. As this field requires the application of science and technology to the processing, utilisation, preservation, packaging and distribution of food and food products, it encompasses a diverse range of specialisations.

The work of food technologists is mainly in food industries, quality control departments, hotels, hospitals, labeling and packaging industries, breweries/distilleries, soft drink industries, dairy, confectionery, fish and meat processing, fruit and vegetable processing, processing of grains, cereals, millets, rice and flour mills, etc. Their expertise is useful in various departments such as purchase and storage, processing/manufacture, quality monitoring and management, safety assessment, as well as research and development. Besides this, entrepreneurship is a highly rewarding avenue. There are various avenues for employment.

### CAREER AVENUES

- Production Managers
- Project Implementation
- Marketing and Sales Personnel
- Sensory Evaluation
- Quality Assurance
- Research and Development, Product Development
- Project Financing
- Project Appraisal
- Teaching and Research
- Entrepreneurship Development
- Consultancy
- Technical Marketing of products

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With globalisation, Indian shores have opened up to foreign investments and technologies. As a result, many foreign companies and multinational companies are setting up their production, R&D, educational and outsourcing facilities in our country. Thus there is ample scope for food technologists/scientists in Indian as well as foreign organisations. Also, food processing industry provides good opportunity for export of products. Employment exchanges will also be strengthened and upgraded.

*Self Employment Avenues*: Food processing in India has always been practised as household or cottage scale activity. Despite lack of basic training in food processing operations, sweets, papads, murrabas, pickles, fried snacks, roasted and puffed cereals were prepared and marketed for local consumption. Now with the growth in agriculture, horticulture and pisiculture, the production of raw material has improved. Also the Government is giving incentives and support for enterpreneurs who want to start their own enterprise by way of providing finances, training, infrastructure and marketing facilities. Financial support is provided by many banks, with encouragement for women entrepreneurs. State Governments also contribute by providing space to those desirous of obtaining the same. A self employment venture in food technology may be highly technology-oriented and investment–intensive, or it can be a very low key technology and low investment unit, e.g., salted peanuts, drinking water pouches, dehydrated products, pickles, among others.

The Indian food industry with a size of 61 billion US dollars, ranks 5$^{th}$ in terms of size, contributes nearly 6 per cent of GDP, 13 per cent of Indian exports and involves 6 per cent of total industrial investment in the country. Besides, it is estimated to grow at the rate of 20 per cent of which processed food segment accounts for 25 per cent. Key segments of this industry are milk and milk products, snack foods, bakery products, fruit and vegetable products, beverages (alcoholic and non alcoholic), fish and meat processing, food processing machines and allied equipment. Exports are rising and this boosts employment avenues.

## Key Terms

Food processing, food technology, food preservation, food science, food spoilage, food product development



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## REVIEW QUESTIONS

1. Explain the following terms:(A) Food Science (B) Food Processing (C) Food Technology (D) Food Manufacturing and (E) Food Spoilage
2. Explain briefly the significance of Food Technology. How has it affected the life of modern housewives, specially working women?
3. List some of the old methods of food preservation followed at home giving examples and their viability in present times.
4. Give a brief account of development of food preservation to its present status.
5. As a prospective food technologist what knowledge and skills does the industry require you to have?
6. Keeping the concept of health and wellness in mind, explain with examples how food scientists are trying to enhance the food values in processed and packaged foods.
7. Explain the following briefly:
   - Why do we need to process and preserve food?
   - What causes food spoilage and renders it unfit for human consumption?
   - Food spoilage is generally caused by bacteria. What are the four conditions that bacteria need to grow and multiply?
   - What is done in food processing to extend shelf life?
   - After the completion of 10+2 examination what is the professional scope in the field of Food Processing and Technology?

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## Practical 1

**Theme: Design, Prepare and Evaluate a Processed Food Product**

Tasks:
1. Identify and prepare a product that can be preserved.
2. Evaluate the product for acceptability.
3. Prepare a label.

### Purpose

This practical is intended to give the students first hand experience of planning, preparing, packaging and labeling a processed product which can be preserved. It will also provide an opportunity to appreciate the importance of maintaining hygiene throughout the process and to evaluate the processed product.

### Conducting the Practical

Divide the class into groups of 5-6 students each. Each group should do the practical separately following the steps given below:

1. Identify a product that has long shelf life (that can be preserved and stored) that you would like to prepare, e.g., pickles, jams, squash, murabba, papad.
2. Try and make it different from products already available in the market by using different raw ingredient(s) or consider using artificial sweetener partly instead of sugar. Make approximately 500 gm of the product. Try to use locally available fruits and vegetables/ fruit or vegetable peels e.g., watermelon rind, orange peel or lemon rind/ sweet lime rind, pumpkin seeds, melon seeds, dudhi peel.
3. Make a list of vegetables/fruits, ingredients, preservatives, utensils, gadgets and medium of heat required, and collect all.
4. List the criteria used in the selection of raw materials, equipment and accessories.
5. Write the recipe and method of preparation, step-wise, in detail.
6. Identify the packaging material e.g., glass/plastic bottle or polyethylene pouches or bags.
7. Prepare the product under as hygienic conditions as possible.
8. Do costing in terms of cost of food materials and ingredients, energy consumed, labour cost and cost of storage and packing material.



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9. Evaluate the product in terms of texture, taste, colour and quality and write down your observations.
10. Also prepare a label for the product. The label information should include the following:
    a) Name of the product and a picture or drawing (if possible).
    b) Name and address of the manufacturer.
    c) List of ingredients used (the ingredients should be listed in descending order of the proportions used), net weight/volume.
    d) Instructions for use (if any).
    e) Storage instructions.
    f) Indicate the 'Use By' or 'Best Before' date.

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CHAPTER

5

# FOOD QUALITY AND FOOD SAFETY

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## LEARNING OBJECTIVES

After completing this chapter the learner will be able to:

- explain the importance of various issues related to food safety and quality
- understand how food-borne illnesses occur
- know about national and international food standards and their role in ensuring food quality and safety
- understand the importance of food safety management systems
- be acquainted with various career avenues / options in this area.

## INTRODUCTION

Food is a major determinant of health, nutritional status and productivity of the population. It is, therefore, essential that the food we consume is wholesome and safe. Unsafe food can lead to a large number of food-borne diseases. You may have seen reports in the newspapers about health problems caused by contaminated or adulterated foods. Globally, food-borne illness is a major problem of public health concern. In India, the National Family Health Survey, 2015–2016 stated

that more than 9 lakh children less than five years of age suffered from acute diarrhea. Food-borne illness can not only result in mortality but can damage trade and tourism, lead to loss of earnings, unemployment and litigation and thus can impede economic growth, and therefore food safety and quality have gained worldwide significance.

## Significance

Food safety and quality are important at the home level, but are critical in large scale food production and processing, and also where food is freshly prepared and served. In the past, many foods were processed at home. Advancement in technology and processing, higher per capita incomes and better purchasing power as well as increased consumer demand have led to a variety of processed foods, food for health / functional foods being manufactured. Safety of such foods needs to be assessed.

The quality of food stuff, raw as well as processed is of public health concern and must be addressed. In the past decade, safety challenges faced globally as well as in India have changed significantly and issues related to food quality and food safety have gained tremendous importance. A number of factors are responsible for this:

- With fast changing lifestyles and eating habits, more people are eating outside their homes. In commercial settings, foods are prepared in bulk handled by many persons, thus there are more chances of food getting contaminated. Further, food items are prepared many hours in advance, and may spoil if not stored appropriately.
- There are many processed and packaged foods. Safety of these foods is important.
- Spices and condiments, oilseeds were processed at home in former times and purity of these were not a concern. In today's world, pre-packaged individual spices, condiments, spice powders and mixes are in demand, especially in cities and metros. Quality of even raw food stuff besides processed foods is of public health concern and must be addressed.
- Logistics governing transport of bulk food is complex and there is a long gap between processing and consumption. Thus risk assessment and safety management during mass production and mass distribution is critical.
- Microbial adaptations, antibiotic resistance, altered human susceptibility and international traveling have all contributed to increasing incidence of food-borne microbial diseases. Nearly half of



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all known food-borne pathogens have been discovered during the past 25-30 years. There are still many food borne illnesses of unknown etiology. This is an issue of global public health concern and there is a need to detect, identify and recognise emerging pathogens and establish active surveillance networks, nationally and internationally.

- India is a signatory to the World Trade Organisation (WTO) non-tariff agreement, which has provided greater access to world markets and opportunities to all countries to enter international trade. In this scenario, it has become essential for every country to protect the safety and quality of foods and also ensure that imported foods are of good quality and safe to eat. Effective food standards and control systems are required to protect food production within the country as well as to facilitate trade with other nations. All food manufacturers are required to meet the given standards of quality and safety, and need to have their products regularly tested.
- Pollution in atmosphere, soil and water, including use of pesticides in agriculture, bring their share of contaminants. Also use of additives such as preservatives, colourants, flavouring agents and other substances such as stabilisers makes the analysis of food for various components—both nutrients and contaminants—imperative.

Owing to the above factors, there is a growing concern for safe, wholesome and nutritious foods in a highly dynamic food business environment, which in turn has greatly expanded the scope and has increased career opportunities in this sector. Before learning about the various career options in this field, it will be worthwhile for us to understand the basic concepts regarding food quality, food safety, risk assessment, food standards and quality management systems.

## Basic Concepts

### Food Safety

*Food safety* means assurance that food is acceptable for human consumption according to its intended use. An understanding of food safety is improved by defining two other concepts — toxicity and hazard.

*Toxicity* is the capacity of a substance to produce harm or injury of any kind under any conditions. *Hazard* is the relative probability that harm or injury will result when substance is not used in a prescribed manner and quantity. Hazards can be physical, chemical and biological causing harmful / adverse effects on the health of consumers.



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*Physical hazard* is any physical material not normally found in food, which causes illness or injury and includes wood, stones, parts of pests, hair etc. (Fig. 6.1).

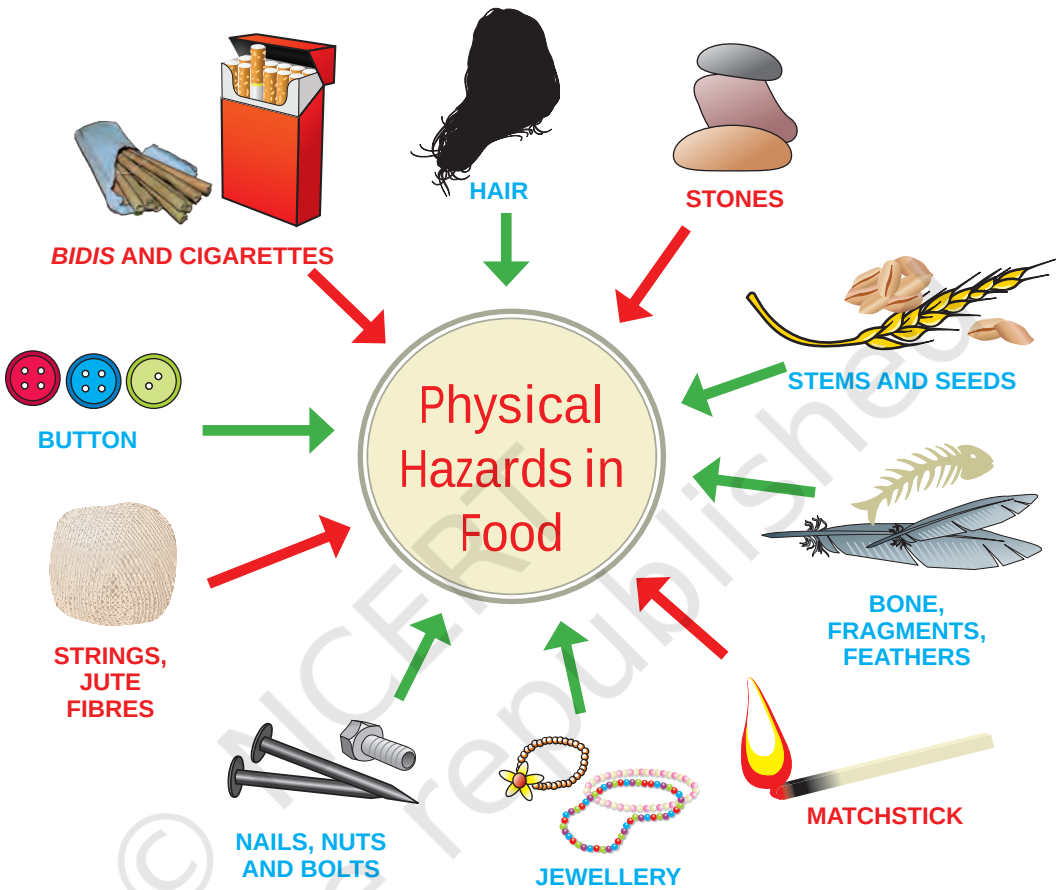


***Fig. 6.1.: Physical hazards in foods***

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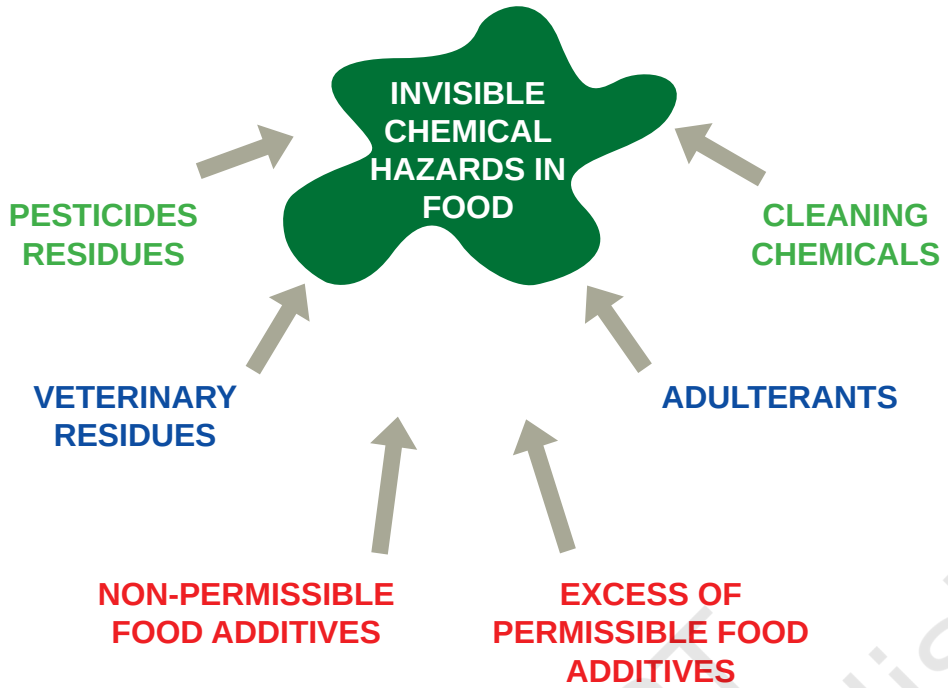


***Fig. 6.2: Chemical hazards in foods***

*Chemical hazards* are chemicals or deleterious substances which may be intentionally or un-intentionally added to foods. This category of hazards includes pesticides, chemical residues, toxic metals, polychlorinated biphenyls, preservatives, food colours and other additives (Fig. 6.2).

*Biological hazards* are living organisms and include microbiological organisms (Fig. 6.3 and 6.4). Those micro-organisms which are associated with food and cause diseases are termed food-borne pathogens. There are two types of food-borne diseases from microbial pathogens—infections and poisoning.

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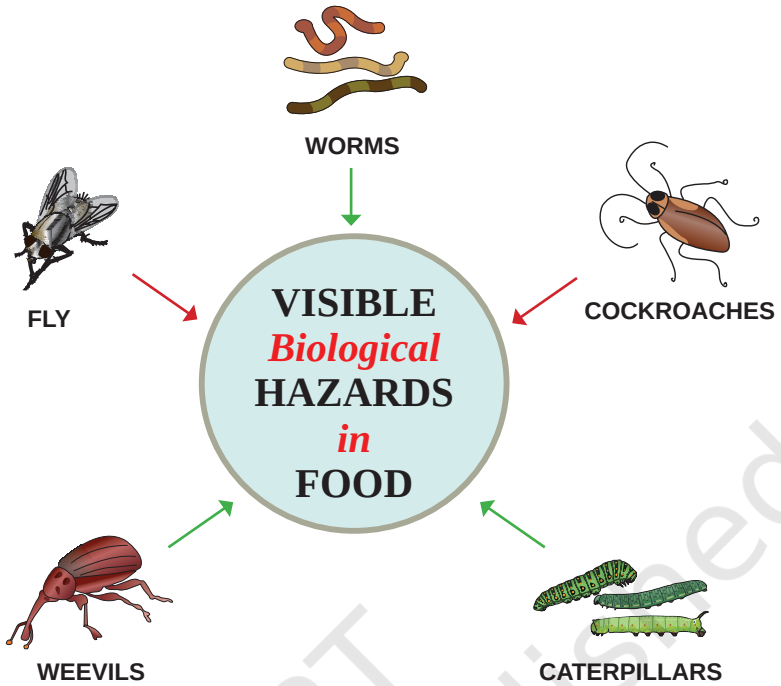


*Fig. 6.3.: Visible biological hazards in foods*

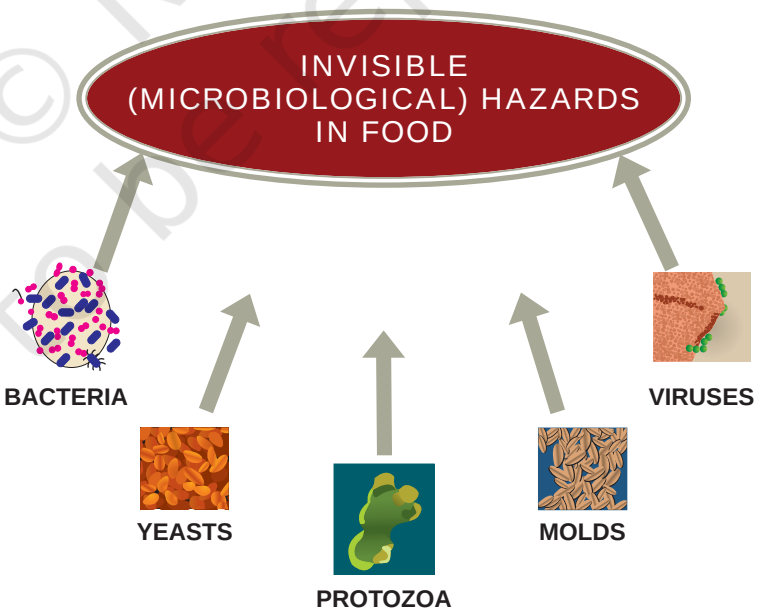


*Fig. 6.4.: Invisible/microbiological hazards in foods*

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*Food infection / Food Poisoning* results from ingestion of live pathogenic organisms which multiply in the body and cause disease. *Salmonella* is a classic example. This organism exists in the intestinal tract of animals. Raw milk and eggs are also sources. Heat destroys *Salmonella,* however, inadequate cooking allows some organisms to survive. Often *Salmonella* is spread through cross-contamination. This could happen when a cook cuts raw meat/poultry on a chopping board and without cleaning uses it for another food which does not involve any cooking, such as salad. Food may become infected by *Salmonella* if an infected food handler does not wash hands with soap after using bathroom and before touching food. *Salmonella* can reproduce very quickly and double their number every 20 minutes. The symptoms of *Salmonella* infection include diarrhea, fever and abdominal cramps.

*Food intoxication:* Some bacteria produce harmful toxins which are present in food even if pathogen has been killed. Organisms produce toxins when the food has not been hot enough or cold enough. Toxins in food cannot be detected by smell, appearance or taste. Hence foods which smell and appear good are not necessarily safe. One example of such an organism is *Staphylococcus aureus*. Such organisms exist in air, dust, water. They are also present in the nasal passage, throat and on skin, hair of 50 per cent of healthy individuals. People who carry this organism, contaminate food if they touch these places on body while food handling. Diarrhea is also one of the symptoms of this contamination.

Parasites can also cause infestation, e.g., worm infestation by tape worm in pork. In addition to this, food can be infested by pests and insects (Fig. 6.5).

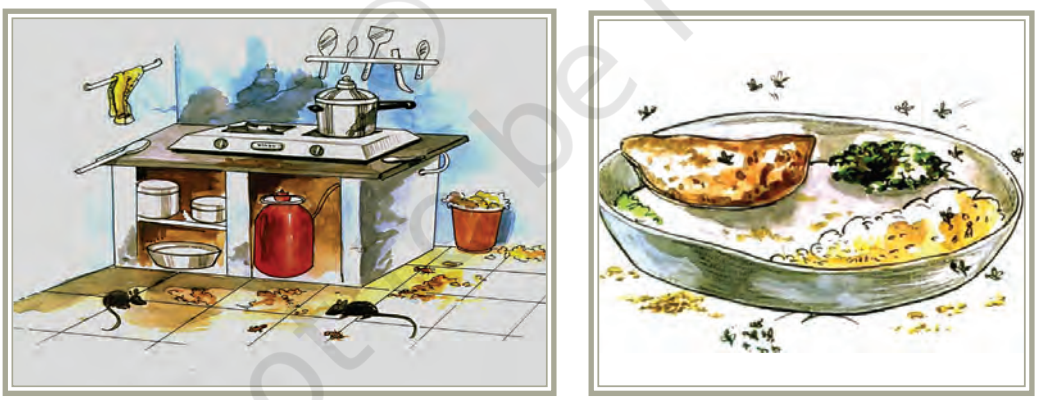

***Fig. 6.5: Infestation of foods***

Among the various hazards, biological hazards are an important cause of food-borne illnesses. In spite of all the efforts in the area of food safety, microbial food-borne pathogens are still a serious concern and new pathogens continue to emerge.

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Factors that are important in the emergence of pathogens include human host, animal hosts and their interactions with humans, the pathogen itself, and the environment including how food is produced, processed, handled and stored. For example, changes in host susceptibility due to malnutrition, age and other conditions can allow for the emergence of new infections in vulnerable populations. Genetic exchange or mutations in the organisms can create new strains with the potential to cause disease. Exposure to new pathogens through changes in eating habits, climate, mass production, food processing and increased globalisation of the food supply can allow pathogens to emerge in new populations or new geographic areas.

Examples are *Norovirus, Rotavirus*, hepatitis E contributing to about 70 per cent of cases. New pathogens will continue to evolve and there is a need to develop methods to isolate them, control them and detect their presence in foods.

In the context of food safety, it is important to understand the terms contamination and adulteration.

***Contamination***: It is the presence of harmful, or objectionable foreign substances in food such as chemicals, micro-organisms, dilutants before/during or after processing or storage.

***Adulteration:*** Food adulteration is the process in which the quality of food is lowered either by the addition of inferior quality material or by extraction of valuable ingredient. It not only includes the intentional addition or substitution of the substances but biological and chemical contamination during the period of growth, storage, processing, transport and distribution of the food products. It is also responsible for lowering or degradation of the quality of food products.

***Adulterants:*** are those substances which are used for making the food products unsafe for human consumption.

Having understood what food safety is, let us discuss food quality.

Food Quality: The term food quality refers to attributes that influence a product's value to consumers. This includes both negative attributes such as spoilage, contamination, adulteration, food safety hazards as well as positive attributes such as colour, flavour, texture. It is therefore a holistic concept integrating factors such as nutritional traits, sensorial properties (colour, texture, shape, appearance, taste, flavour, odour), social considerations, safety. Safety is a preliminary attribute and precursor of quality. In order to ensure that foods are safe and of good quality, across the world various governments and international bodies have laid down food standards that manufacturers/suppliers are expected to adhere to.



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Thus, all food service providers (those involved at all stages of pre-preparation and preparation/processing, packaging and service) should adhere to good manufacturing practices and ensure food safety. Salient points to be borne in mind are:

1. Quality of raw materials and water
2. Cleanliness — of the premises, personnel, equipment, food preparation and storage and serving areas
3. Storage of food at appropriate temperature
4. Food hygiene
5. Good service practices.

**Activity 1**

Collect 5 fresh fruits, 5 fresh vegetables and one food preparation e.g., bread/chapati/roti and list the signs of quality in the given format. Store them at room temperature for one week, observe the changes and prepare a chart listing the changes in quality.
Name of Foodstuff / Product

| | Fresh | During storage | |
|---|---|---|---|
| | | Day 2 or 3 | Day 7 |
| Appearance<br>i) Bright / Dull<br>ii) Shrivelled<br>iii) Mouldy | | | |
| Texture (Firmness/ softness/soggy) | | | |
| Colour | | | |
| Odour | | | |

## Food Standards

Effective food standards and control systems are required to integrate quality into every aspect of food production and service, to ensure the supply of hygienic, wholesome food as well as to facilitate trade within and between nations. There are four levels of standards which are well coordinated.

a. *Company Standards*: These are prepared by a Company for its own use. Normally, they are copies of National Standards.

b. *National Standards*: These are issued by the national standards body, Food Safety and Standards Authority of India (FSSAI).



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c. *Regional Standards:* Regional groups with similar geographical, climate, etc. have legislation standardisation bodies.

d. *International Standards:* The International Organisation for Standardisation (ISO) and Codex Alimentarius Commission (CAC) publish international standards.

**Food Standards and Regulations in India**

***Voluntary product certification:*** There are voluntary grading and marking schemes such as ISI mark of BIS and Agmark. The Bureau of Indian Standards (BIS) deals with standardisation of various consumer goods including food products and runs a voluntary certification scheme known as 'ISI' mark for processed foods. Agmark is a voluntary scheme of certification of agricultural products (raw and processed) for safeguarding the health of consumers.

Since the government had several regulations and laws, food industry found it cumbersome to adhere to. A need was therefore felt to integrate all such laws for regulating the quality of food. With this in view, *Indian Government* has passed Food Safety and Standards Act (FSSA), 2006, to bring the different pieces of legislation pertaining to food safety under one umbrella.

**Food Safety and Standards Act, 2006:** The objects of the Act are to consolidate the laws relating to food. The Food Safety and Standards Authority of India (FSSAI) has been established under Food Safety and Standards, 2006, which consolidates various acts and orders that have hitherto handled food related issues in various Ministries and Departments. The Food Safety and Standards Authority of India was established for laying down *science-based standards* for food and to regulate their manufacture, storage, distribution, sale and import, to ensure availability of safe and wholesome food for human consumption. The Act has provisions for maintenance of hygienic conditions in and around manufacturing premises, assessment and management of risk factors to human health in a scientific manner, which were not specified in the PFA. The FSSA reflects the international shift in food laws, from compositional standards or vertical standards to safety or horizontal standards.

Food Safety and Standards Authority of India (FSSAI) has been mandated by the Food Safety Standards Act, 2006 for performing the following functions:

- Framing of regulations to lay down the standards and guidelines for articles of food and system of enforcing various standards.

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- Laying down mechanisms and guidelines for accreditation of certification bodies for certification of food safety management system for food businesses and accreditation of laboratories and notification of the accredited laboratories.
- To provide scientific advice and technical support to Central Government and State Governments for framing the policy and rules related to food safety and nutrition.
- Collect and collate data regarding food consumption, incidence and prevalence of biological risk, contaminants in food, residues of various contaminants in food products, identification of emerging risks and introduction of rapid alert system.
- Creating an information network across the country so that the public, consumers, Panchayats, etc., receive rapid, reliable and objective information about food safety and issues of concern.
- Provide training programmes for persons who are involved or intend to get involved in food businesses.
- Contribute to the development of international technical standards for food, sanitary and phyto-sanitary standards.
- Promote general awareness about food safety and food standards.

For more information visit: https://fssai.gov.in

**International Organisations and Agreements in the Area of Food Standards, Quality, Research and Trade**

Since ancient times, governing authorities the world over, have made attempts to develop and implement food standards in order to protect health of consumers and prevent dishonest practices in sale of food. There have been several international organisations and agreements which have played a role in enhancing food safety, quality and security, facilitating research and trade. The major organisations which are playing a key role are:

1. Codex Alimentarius Commission (CAC)
2. International Organisation for Standardisation
3. World Trade Organisation

*1. Codex Alimentarius Commission*

CAC is an intergovernmental body formed with the objective of establishing international standards to protect the health of the consumers and facilitate



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food and agricultural trade. In 2017, the membership of Codex was 187 member countries and one Member Organisation (European Community) respectively. India is a member through the Ministry of Health and Family Welfare. CAC has become the single most important international reference point for developments associated with food standards. The document published by the CAC is Codex Alimentarius which means 'Food Code' and is a collection of internationally adopted Food Standards. The document includes Standards, Codes of Practice, Guidelines and other recommendations in order to protect consumers and ensure fair practices in food trade. Different countries use Codex Standards to develop national standards.

The Prevention of Food Adulteration Act 1954 (PFA, 1954) was enacted by the Government of India to prevent adulteration of food. The Act has been amended over 200 times as per need. In addition to PFA, there are other Orders or Acts that help to ensure the quality of specific foods such as:

- Fruit and Vegetable Product Order: Specifications for fruit and vegetable products are laid down.
- Meat Food Products Order: Processing of meat products is licensed under this order.
- Vegetable Oil Products Order: Specifications for vanaspati, margarine and shortenings are laid down.

All such acts have been consolidated under the Food Safety and Standards Act.

All food products manufactured in India, or imported and sold in India have to meet the requirements prescribed under the Food Safety and Standards Act.

*2. International Organisation for Standardisation (ISO)*

The International Organisation for Standardisation (ISO) is a worldwide, non-governmental federation of national standards bodies (ISO member bodies). The mission of ISO is to promote the development of standardisation and related activities in the world with a view to facilitate the international exchange of goods and services, and to develop cooperation in the spheres of intellectual, scientific, technological and economic activity. The work done by ISO results in international agreements which are published as International Standards.

ISO 9000 is an international reference for quality requirements. It is concerned with "Quality Management" of an organisation. Adoption of these standards is voluntary. The difference between Codex and ISO are given in the box given hereby.

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**Differences between Codex and ISO**

| Codex | ISO |
|---|---|
| • Used to develop national regulations<br>• Slow to change<br>• Describe the minimal acceptable practices | • Voluntary<br>• Standards are reviewed every five years.<br>• Describe current standard industrial practices. |

*For more information visit http.www.iso.org*

3. *World Trade Organisation (WTO)*

WTO was established in 1995. The main objective of WTO is to help trade flow smoothly, freely, fairly and predictably, by administering trade agreements, settling trade disputes, assisting countries in trade policy issues. The WTO Agreement covers goods, services and intellectual property.

In order to enforce adoption and implementation of standards, there is a need for a strong Food Control System. An effective food control system must consist of — (i) Food Inspection and (ii) Analytical capability.

*Food Inspection:* Conformity of products to standards is verified through inspection. This will ensure that all foods are produced, handled, processed, stored and distributed in compliance with regulations and legislation. Government / Municipal authorities appoint food inspectors to investigate the status of quality conformity to standards in their laboratories.

*Analytical capability*: There is need for well-equipped, state-of-the-art accredited laboratories to carry out analysis of food. Further, well- trained personnel having knowledge of principles of laboratory management and physical, chemical and microbiological analysis of food, test foods and food products are also required. A broad range of analytical capabilities is required for detecting food contaminants, environmental chemicals, biotoxins, pathogenic bacteria, food-borne viruses and parasites.

## Food Safety Management Systems

Over the years, issues related to food safety and quality have gone beyond just the avoidance of food-borne pathogens, chemical toxicants and other hazards. A food hazard can enter/come into the food at any stage of the food chain, therefore, adequate control through out the food chain is essential. Food safety and quality can be ensured through:



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- Good Manufacturing Practices (GMP)
- Good Handling Practices (GHP)
- Hazard Analysis Critical Control Points (HACCP)

*Good Manufacturing Practices* (GMP) are a part of quality assurance to ensure that manufacturers/processors take proactive steps to ensure that their products are safe. It enables to minimise or eliminate contamination and false labelling, thereby protecting the consumer from being misled and helping in purchasing products that are not harmful. GMP is a good business tool that helps to refine compliance and performance by the manufacturers/producers.

*Good Handling Practices* indicate a comprehensive approach from the farm to the store or consumer, in order to identify potential sources of risk and indicates what steps and procedures are taken to minimise the risk of contamination. It ensures that all persons who handle food have good hygiene practices.

**Hazard Analysis Critical Control Point (HACCP)**

HACCP is a means of providing assurance about safety of food. HACCP is an approach to food manufacture and storage in which raw materials and each individual step in a specific process are considered in detail and evaluated for its potential to contribute to the development of pathogenic micro organisms or other food hazards. It involves identification of hazards, assessment of chances of occurrence of hazards during each step /stage in the food chain — raw material procurement, manufacturing, distribution, usage of food products and defining measures for hazard(s) control.

Why implement HACCP?

**Activity 2**

Visit a nearby restaurant / canteen / dhaba / street food vending outlet and observe the following:

- The area where food is prepared and served
- How the food is prepared and stored
- How the food is served
- The food service area
- Washing area
- The area surrounding the unit
- All persons involved in handling the food from pre-preparation till its service.

Comment on the cleanliness and hygiene and give suggestions for improvement.

Prepare a pamphlet on food safety and hygiene for the workers using ICT.

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- It is a preventive approach to ensure food safety.
- End product inspection and testing, although important, is time consuming, expensive and detects the problems only after they occur. In contrast, HACCP enables us to detect hazards at any stage of processing or manufacture in order to ensure a good quality end product, by taking appropriate action at the stage where the problem occurs.
- It enables producers, processors, distributors and exporters to utilise resources efficiently and in a cost effective manner for assuring food safety.
- FSSA, 2006 places primary responsibility for safe food with producers and suppliers through HACCP, GMP, GHP. This is important for consumer protection and international food trade.
- It assures consistently good quality products.

## Scope

India is experiencing growth in the area of food processing. The food industry in India accounts for about 26 per cent of the gross domestic product (GDP) and will be one of the major growth areas in the years ahead. This has given impetus to international trade but has also increased the responsibility to achieve appropriate level of safety in terms of sanitary and phyto-sanitary protection. Further, the Indian Food Safety and Standards Act of 2006, reflects a major shift in food laws and seeks to provide greater consumer protection by ensuring safety and wholesomeness of food at all stages of the food chain. This changing scenario has widened the scope and increased career options/opportunities in this area.

Professionals who take up careers in this area need to have adequate knowledge and expertise in Food Chemistry, Food Processing and Preservation, Food Analysis and Quality Control. It is also desirable to be well versed in Food Microbiology, Food Laws and Sensory Evaluation. Professionals may be employed with regulatory and public health agencies as food legislators, food safety officers (inspectors), food analysts/public analysts. Professionals can also work in voluntary agencies such as Agmark, BIS, as well as in the Quality Control Laboratories. One can work as food auditor after undergoing required training. Further, large food industries, flight kitchens, etc. have in-house quality control units which require trained professionals. In a Food Industry, numerous opportunities are available as shown in Fig. 6.6.



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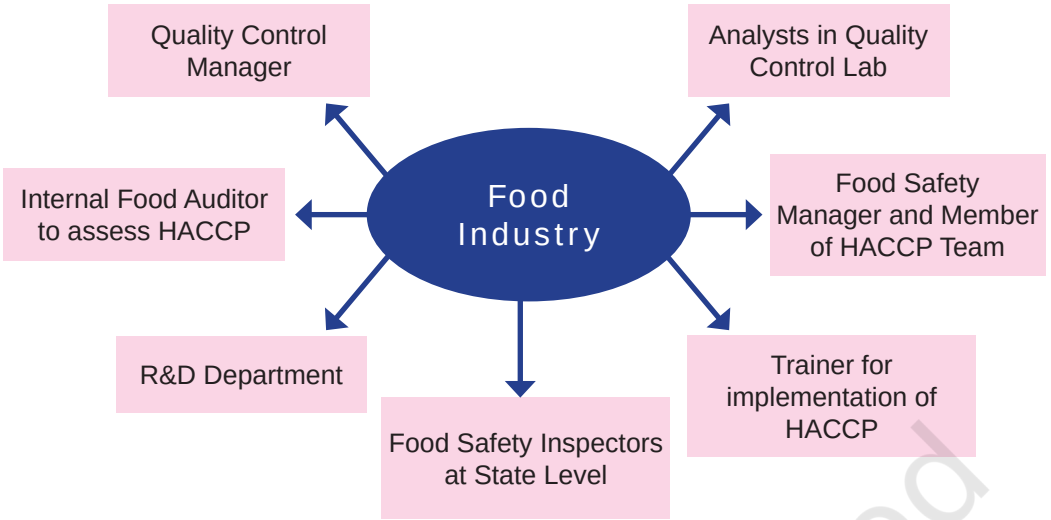


***Fig. 6.6: Job Opportunities in Food Industry***

*Self-employment and Entrepreneurship:* One can initiate entrepreneurship activities through analytical food laboratory, food safety consultancy and Food Safety and Sanitation Education.

Placement options are emerging at different levels in both regulatory and health agencies. Integrated approaches in Home Science curriculum, especially in the discipline of Food Science and Nutrition, impart the knowledge to improve safety and quality. The courses enable to develop skills necessary to understand and manage food safety hazards.

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## Career Avenues

- Quality Control Laboratories in food industry as analysts or at managerial level
- Food testing laboratories in public and private sector — various positions including food inspectors, food testing
- Specialist in HACCP
- Food Auditors
- Quality Certification such as ISO
- Teaching and Academics
- Research
- Scientific writers
- Involuntary organisations in various capacities

## Key Terms

Food borne illness, food poisoning, food quality, food safety, hazards, food standards, Food Safety and Standards Act.

## Review Questions

1. Explain why food safety and quality are of global concern.
2. Explain the terms: hazard, toxicity, contamination, food quality, adulteration.
3. What is Codex Alimentarius?
4. Discuss the significance of HACCP.
5. List the national and international food standards.

## Practical 1

**Theme: Test of Food Adulteration**

**Tasks:**
1. Visit local shops and collect various food materials – raw and cooked
2. Examine the foods for presence of adulterants
3. Record observations

**Purpose:** This practical will expose the students to simple ways of identifying adulteration in foods and understand the importance of quality and safety.

### Conducting the Practical

1. Divide the class into 3 groups.
2. Each group will bring samples of food as follows:
   - *Group A:* raw foods such as rice, wheat, pulses, spices such as mustard seeds, coriander seeds, *jeera*, tea leaves (Note : 100 g of each should be procured from two different shops, preferably loose unpacked materials should be procured).
   - Group B will bring snacks such as *pakodas*, *idlis*, *samosas* or any that are available locally from two or three different roadside vendors.
   - Group C will bring assorted *mithais*/Indian sweets from two different vendors.
3. All groups will use the work sheet given and evaluate the foods for the presence or absence of various hazards.



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## WORK SHEET

| | Present in Large Amounts/ Numbers | Present in Moderate Amounts/ Numbers | Present in Small Amounts/ Numbers | Absent |
|---|---|---|---|---|
| **Have you found any of the following raw food ingredients used in your preparations?** | | | | |
| Hair | | | | |
| Stones | | | | |
| Stems & seeds | | | | |
| Matchsticks | | | | |
| Stapler pins | | | | |
| Bidis/ Cigarettes | | | | |
| Camphor balls | | | | |
| Worms/Insect parts | | | | |
| Mercury balls | | | | |
| Infested grains | | | | |
| Any other | | | | |

4. Use separate worksheets for each vendor and each food.
5. Compare and comment on the quality of various food items.

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## Practical 2

**Theme: Qualitative Tests for Food Adulteration**

**Tasks:**

1. Collect all the chemicals and glassware needed for the tests listed below.
2. Collect the foods to be tested from different sources such as branded, unbranded packed and loose.
3. Perform the tests for the foodstuffs as per the procedures given.
4. Interpret the results of the tests.
5. Compare the branded, unbranded packed and loose food items and comment on the quality of the food stuffs.

**Purpose:** This practical will acquaint students with some qualitative tests of food adulteration. It will provide hands-on experience in testing the foods and enable them to comment on the quality of the tested foods. It will also enable them to appreciate the importance of good quality foodstuffs.

### Conducting the Practical

Class is to be divided into groups of 3-4 each. Each group is to bring to class samples of the following:

1. Pepper: branded packed, unbranded packed and loose – 25 g each
2. Ice cream : branded and unbranded (manufactured and sold by local vendor) 1 small cup
3. Milk : branded packaged, loose ( 100ml)
4. Vegetable oil :– sesame oil, groundnut oil, hydrogenated fat/ vanaspati, branded and unbranded loose pure ghee( 25g each)
5. Tea leaves: branded , loose locally available leaf teas ( 3 in number) 100g of each sample
6. Turmeric powder: branded, unbranded packed and loose
7. Asafoetida powder: branded and unbranded loose

Collect the chemicals as listed in the practical for each foodstuff.

Conduct the tests as per the procedures outlined.



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**Tests**

1. **Test for Detection of Sesame Oil in Pure Ghee to determine whether the ghee is adulterated with hydrogenated fat/ vanaspati which contains sesame oil.**

**Chemicals**: 1 per cent sucrose solution

Concentrated hydrochloric acid

**Procedure:** Take 5 test tubes.

In Test tube A pour approx 2 ml of sesame oil.

In Test tube B pour approx 2 ml of groundnut oil.

In Test tube C pour approx 2 ml of melted vanaspati.

In Test tube D pour approx 2 ml of melted branded ghee.

In Test tube E pour approx 2 ml of melted loose ghee.

To each test tube, add 1 ml of 1 per cent sucrose solution.

Then to each test tube, add 1ml of concentrated hydrochloric acid.

Shake each test tube well.

**Observation**: Note if a pink colour develops. Development of pink colour indicates presence of sesame oil.

**Interpretation**: Are the ghee samples pure or adulterated?

2. **Test for presence of excessive amount of stalks in tea leaves**

**Procedure:**

1. Weigh 5 gm of tea leaves into a conical flask or a beaker. Label the container.
2. To this add 500 ml of water and boil the flask/beaker for 15 minutes.
3. Filter out the water.
4. Transfer the tea sample to a flat white plate and with a forceps, pick out the stalks and place them in a preweighed petridish or crucible.
5. Dry the stalks at 100 degrees until all the moisture has evaporated.

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6. Weigh the stalks.
7. Calculate the percentage of stalks in the tea.

**Interpretation:** The proportion of stalks in the tea should be less than 25 per cent.

### 3. Test for detecting Light berries in Black Pepper

**Chemicals:** Alcohol water mixture (sp.gr 0.8 to 0.82)

**Procedure:**

1. Take about 10g of the pepper sample in a 250 ml beaker.
2. Add approximately 150–200 ml of the alcohol water mixture.
3. Pick out the berries which rise to the top and float.
4. Dry the berries and weigh them.
5. Calculate the percentage of dried berries.

**Interpretation:** The higher percentage of light berries, suggests that the berries have been extracted from the black berries.

### 4. Test for the presence of metanil yellow in turmeric

**Chemicals:** Hydrochloric acid concentrated

**Procedure:**

1. Take about 2 g of turmeric sample in a test tube.
2. Add 5ml of distilled water.
3. Mix well.
4. Add concentrated hydrochloric acid (about 5 ml to 10 ml) slowly into the tube.

**Observation:** Observe the test-tube for development of pink to magenta colour.

**Interpretation:** Development of pink to magenta colour denotes the presence of metanil yellow which is a toxic adulterant.



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**5. Test for the presence of starch in milk and ice cream**

**Chemicals:** Iodine solution

**Procedure:**

1. In a test tube, add approximately 10 ml of milk or melted ice cream.
2. Add iodine solution, drop by drop.
3. Mix the contents of the test tube.

**Observation:** Observe for appearance of blue colour.

**Interpretation:** Development of blue colour indicates the presence of starch in the sample.

**6. Test for the presence of colophenial resins in asafetida (hing)**

**Chemicals:** 0.5 per cent copper acetate solution in water

Petroleum ether

**Procedure:**

1. Take about 1-2 g of asafetida sample in a test tube. Add approximately 10 ml of petroleum ether.
2. Shake the test tube well.
3. Filter the contents of the tube.
4. To 5 ml of the filterate add 5 ml of copper acetate solution.
5. Shake and allow the layers to separate.

**Observation:** Note whether a blue or green colour develops in the ether layer.

**Interpretation:** Development of blue or green colour denotes the presence of colophenial resins that are not permitted.

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# Notes

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# UNIT III

# HUMAN DEVELOPMENT AND FAMILY STUDIES

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# Introduction

In Class XI, you have read about the importance of studying development of a person from a young age onwards. There are many changes that take place in a person as he or she grows up. Students, who choose to specialise in Human Development and Family Studies (HDFS) study these changes and also learn the ways in which they can provide effective and meaningful services for people at different ages, with different needs and under different circumstances. In the forthcoming chapters, we will explore the different options for careers in this domain. We all know that studying HEFS helps us to know ourselves and the people around us better and to lead a more meaningful life, well integrated in our cultural tradition, with the knowledge of the developing world, science, technology and progress. The home and workplace are treated with equal respect and the personal, family life of any individual is given full consideration in understanding the person.

In accordance with the National Curriculum Framework (2005), all ethnic groups, languages, religions and communities are regarded as equal. In the forthcoming chapters, we will explore the careers that are available to students who wish to work in this field.

At the college level, the discipline of HDFS is referred to by different names in different institutions as Child Development, Human Development and Childhood Studies, and Human Ecology. While the core of the discipline remains the same, there may be slight differences in their perspectives. For example, when the discipline is referred to as Child Development, there may be a greater focus on childhood and less emphasis on the life span development. However, these differences are only a matter of degree and the substantive component of the discipline remains essentially similar.

A career in HDFS is especially suitable for those who feel drawn towards understanding interpersonal relationships and find it comfortable to talk about these issues. A fair degree of honest self-reflection is usually a part and parcel of the career in HDFS – this can be exciting as you learn more about yourself and others around you.

While the HDFS discipline helps you to develop the abilities to work with individuals and groups across the life span, from the very young to the old, you will find that the organisations and the programmes in the field focus on specific dimensions. Some may work with children in the early childhood years to create conditions for their all round development; some may be involved in providing counselling services to specific age groups; and some may strive to design interventions in the sector of education. In fact, further in the chapter, we have identified the major areas of work within the domain of HDFS and presented the information accordingly as follows:

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(i) Early Childhood Care and Education, (ii) Guidance and Counselling, (iii) Special Education and Support Services, and (iv) Management of Support Services, Institutions and Programmes for Children, Youth and Elderly.



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Chapter

6

# Early Childhood Care and Education

## Learning Objectives

After completing this section the learner will be able to:

- understand the basic principles of Early Childhood Care and Education (ECCE) as they apply to Indian society
- understand the importance of early care and learning experiences for children
- understand how children play and learn
- explain the knowledge and skills required for a career in ECCE

## Significance

Early childhood care and education is a very important area of study in Human Development. We have learnt in Class XI, how the infant begins to learn from a very early age. In addition to learning new things about the world around him or her, the infant is developing an attachment with family members, particularly with the mother and father, as well as with siblings, and grandparents. The young child also begins to recognise other family members and people whom he or she meets regularly. This way, the child will also be able to distinguish between people who he/she recognises and those who look unfamiliar. This recognition is manifested in the behaviour where a young baby of around 8–12 months can show

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fear of unknown people. This fear is not simply an emotional display, it shows a capacity to recognise familiar faces and thereby indicates a fear of unfamiliar people. Further, the child is deeply attached to the mother who is generally, but not always, the primary caregiver and can also start to cry when she leaves the room. The young child of around one year will try to cling to the mother or other caregiver and follow her everywhere. In most cases, this behaviour is soon discarded because the child develops the ability to know that the mother does not 'vanish' when she goes into another room. The child develops a sense of security even about the primary caregiver's absence. Further, the child is growing very rapidly, learning to walk, pick up things with precision, and manage his or her body in many ways. The child is also developing control over bladder and bowel movements.

In most cases, children are brought up exclusively within a family for the first few years. In some instances, where the mother is working outside the home, there may be a need for substitute provisions for the care of the child. Traditionally, the care of the child was usually the responsibility of another female of the household who lived with the family permanently (as in joint families) or temporarily resided with the family for support in child care. In recent times, however, there has been an increasing need for the provision of institutional child care. This can take the form of informal family care settings, where a woman in a neighbourhood sets up a 'crèche' in her home for business purposes or an institutionalised centre where children are cared for. The crèche or family care is primarily seen as substitute for the mother/primary caregiver. However, these may not be seen as an essential experience for the enrichment of a child's learning and development.

**ACTIVITY 1**

From your memory of last year's course, list some of the things that you think a child should know how to do or be capable of performing before entering Class1. For example, can a child walk, talk, read full sentences?

(Teacher should discuss these and then add/delete from to the list.)

Ideally, once the child is around three years of age, the activities and experiences begin to expand. However, experts differ on the exact age until which a child should be kept at home, before entry to formal school. Although the child is still capable of enjoying only informal and small group activities, there is an increasing value for opportunities to engage

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with people outside the family and close community. These early years are extremely important for a child to learn new things, explore the environment and discover the world around. Once the children learn to walk and run, manipulate things and speak, they become capable of actively engaging with the environment. It is in interaction with people and materials around them that children at this age gather all the information. Vocabulary in the mother tongue is growing rapidly at this time, as is the child's understanding of nature like sand, water, flowers, birds, machines and other materials. They are curious to learn more and are often heard asking adults when they see something, "Why is this so?". Thus satisfying a child's curiosity by providing an optimal learning environment without overburdening the child to do more than what s/he is capable of is an essential consideration at this age. If we force a child to sit in one place and learn like in a formal school meant for older children, the curiosity will diminish, and a child will feel anxious and insecure. It is thus very important to understand that the best learning environment for a child at this age is one that is safe, secure, loving, with a variety of people and play materials (toys or natural), and the presence of a caring adult, whether it is the mother, grandparent, or a preschool teacher, or a sibling.

The learning and other experiences provided by a good preschool have been found to be extremely beneficial for young children at this age. The child centred approach and the play way method which makes learning enjoyable is ideally suited for young children. Children enjoy the company of other children and learn very quickly to do things that often surprise even the parents. One such observation that often takes place in preschool settings is the sheer wonder that parents of young children express when their child has been known to eat by himself or herself, and also eats things that he/she may not have eaten at home. Children learn very quickly among peers and for these and other reasons, preschool experiences become important at this age. Also, for children who live in difficult circumstances or who may need additional support for learning, a good preschool environment is known to be very beneficial.

Does that mean that children who do not go to nursery school are not learning? Absolutely not! All children learn, naturally. Preschool experiences help to enhance the child's exposure to other adults and other environments and materials; and more importantly, to prepare the young child for formal schooling. Preschool education in a programme which is child-centred and informal, provides the child with a good learning environment that complements the advantages of a good learning environment at home. Also, if in situations where the home environment may be lacking in some way or the other, the preschool experience can be an important factor in assisting the child's growth and development outside the home.

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In several communities, especially those living in remote areas or those with fewer resources at their disposal, older children who are of school-going age are often given the responsibility for the care of younger ones, as parents go out for work. Consequently, the older child is unable to participate in schooling. Therefore institutional care for young children is beneficial for the older child as well since he/she is released from the task of child care and can attend school. Thus, children, both young and of school age, can be helped to have access to services when they live in difficult circumstances. Further these services also provide for interventions in nutrition, health, besides learning as and when there is a requirement. Thus, there is a support to society in the task of developing and building the next generation for the future. Early childhood care and education and care is an activity that benefits childhood in different circumstances, as well as families by providing the support to parents and the community in these basic tasks.

As per the NCF (2005) Position Paper on Early Childhood Education published by NCERT, the basic objectives of ECCE are:

- Holistic development of the child to enable him/her to realise the potential
- Preparation for school
- Providing support services for women and children

## Basic concepts

There are some important concepts associated with early childhood care and education that we must understand before proceeding further. Early childhood is the phase of life from birth till 8 years of age, and is commonly divided into two, from birth to three years and 3–8 years, based on the developmental changes that characterise young children in these two stages. Infancy is the period between birth and one year (some experts also denote infancy till two years), during which a child is largely dependent upon adults for everyday needs. This period is of intense dependence on adults, usually the mother or father, or any other primary caregiver who maybe the grandmother or helper. In circumstances where the mother is employed outside the home, the infant has to be cared for by a substitute caregiver, who may be a family member or a hired person. The location of the substitute care arrangement may be the child's own home or the home of the caregiver or an institution or crèche. Crèche is the name given to an institutional setting that is particularly designed for the care of infants and young children in the absence of home care. Day care, on the other hand, is the care of children in the preschool years and may include infants

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and preschoolers, who are cared for, again in the absence of a primary caregiver at home.

Day care and crèches are usually all-day programmes. Teachers and helpers in these programmes need to be especially trained for the care of very young children, their safety, their feeding, toilet habits, language development, social and emotional needs and learning. Teachers, who have to deal with children above three years of age, require different skill sets. The child between two and three is sometimes referred to as a toddler, a term that is derived from the jumpy walk that a young child has at this age. A preschool child is so called because he or she is now ready for experiencing some sort of environment beyond that of the family (extra-familial). Even for this programme, a teacher needs to be specially trained as a pre-school or nursery school teacher. Some pre-schools for young children are often called Montessori schools. These are schools based on the principles of early childhood education as outlined by a well-known educationist Maria Montessori. It is worth mentioning that the Government of India has addressed the needs of this age grouping by offering pre-school education through the *anganwadis* that operate under its *Integrated Child Development Services* (ICDS). There are angawadis in urban and rural areas.

Some of the other concepts related to this field that we need to know, deal with understanding the fact that children at this age have a very different approach to understanding the things that happen around them. The developmental psychologist Jean Piaget spent his life trying to comprehend and explain that young children have different ways of understanding the world, due to which, they need a supportive environment to explore phenomena in their own ways. You have studied these features of children's development last year in Class XI. It is important to keep those details in mind in order to understand the principles of care and education of young children.

Another important principle to be kept in mind is the fact that any ECCE institution must realise the importance of the cultural context within which it operates and works along with, rather than in opposition to, the family. Although this is true for all ages, it becomes more significant for the young child since he or she is unable to make distinctions about different perspectives and different realities in the ways that an older child or adult can. Thus we have to understand that the educational and care arrangements for children must follow these principles.

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As per the NCF (2005) on ECCE, the guiding principles of ECCE are:

- Play as the basis for learning
- Art as the basis of education
- Recognition of the special features of children's thinking
- Primacy of experience rather than expertise (i.e., experiential learning is emphasised)
- Experience of familiarity and challenge in everyday routines
- Mix of formal and informal interactions
- Blend of textual and cultural sources
- Use of local materials, arts and knowledge
- Developmentally appropriate practices, flexibility and plurality
- Health, well-being and healthy habits.

**Activity 2**

From your childhood, recall and write down any story that you heard and that you enjoyed a lot. Also mention who used to tell you the story and what you liked about the story. Mention which character you liked the best in the story and why.

The teacher should choose some stories for presentation to the class so that the students can learn from each other and share the enjoyment of collective memories and interaction. Also it gives students an opportunity to gain an understanding of other families, cultures and communities.

*Children at play*

*Children enjoy painting*

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***Children exploring nature***

## Preparing for A Career

It has been mentioned earlier that since children under 6 years of age have particular ways of understanding the world and social relationships, have specific developmental needs, any adult attempting to work with children must be carefully and well trained in the field of early child development and care. We might think here that when young women and men become parents, they are not required to have any training in child care, why should a teacher or a caregiver require any training?

There are several reasons why even parents would also benefit from knowing more about how and why children do the things that they do. Parents would also benefit very much from knowing more about expected differences between children of the same age and also appreciate that there are individual differences. They should realise that there is often no point in competitive comparisons between children and even between siblings. Thus we must understand that ALL adults in contact with children WILL, certainly benefit from a scientific understanding of development and growth leading to realistic expectations and interactions with children.

Training and scientific knowledge of childhood, and developmental changes and challenges is even more critical for those adults who choose early childhood programmes as a career. Early child care professionals are responsible for children other than their own. The activities they perform as child care professionals constitute their work and they receive formal recognition for this. Teachers and caregivers are responsible to children who may not be their biological offspring, to the large group of adults who are family members of the children under their supervision and to the

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institution they work for, as well as the larger society. ECCE professionals have to be committed to the children, their well-being and learning, be aware and knowledgeable about their needs and the challenges for providing opportunities for their growth and development.

What is the expectation from an adult teacher/caregiver of young children? During preschool years, a teacher needs to keep all the above points in mind, but there is less of a requirement for supervision of physical care of preschool children, like cleaning, feeding, toilet activity since the child develops the capability to speak, to control his or her bowel and bladder movements, eat independently. A teacher needs to focus more on providing interesting and stimulating opportunities for children to learn new things, experience natural phenomena, provide ample opportunities for a variety of experiences like physical, language, social-emotional and other learning experiences. The focus is on enhancing creative expression and exploration, although these aspects are equally important in the earlier years too.

It is necessary to focus on providing opportunities to young children primarily because they have a greater requirement for adult guidance. If we want to express ourselves creatively as adults, we are quite capable of arranging the necessary conditions for this. If we want to talk to someone, we can take the initiative to do so. Children during pre-school years need the support of adults for such tasks. Lev Vygotsky, a psychologist and educator, had outlined the great need that children have for a concerned, caring and knowledgeable adult. The pre-school educator must have knowledge specifically about the child's capabilities, more than information about the world. By knowing how much a child actually knows and is capable of knowing, an adult can help to provide the optimal environment wherein learning is easy, enjoyable and meaningful. The tasks given to a child should be neither too easy nor too difficult; otherwise a child will either lose interest and/or motivation to engage in the activity.

Some of the skills an early childhood professional needs to have are:

- An interest in children and their development
- Knowledge about the needs and capabilities of young children
- Capacity and motivation for interacting with children
- Skills for creative and interesting activities with children in all areas of development
- Enthusiasm for activities like story-telling, exploration, nature and social interaction
- Willingness and interest in answering children's queries
- Capacity for understanding individual differences



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- Be energetic and prepared for physical activity for considerably long periods of time

Further, in order to prepare for a career in this field, it is essential to have studied about children's development and basic principles of care. For this you will be required to have an undergraduate degree in a subject that has child/human development and/or child psychology as part of the course. However, if there a desire to enter into the field soon after completion of schooling, there is also the option of one year diploma or Open University educational courses in the field. Nursery Teacher Training is another course that offers training in this field.

In addition to the courses that one can attend, and degrees that can be acquired, it is also important to remember that having a predisposition to be open and interactive with children is a fundamental requirement if one wants to become an effective early childhood specialist. The person should also be aware of the community and culture so that the pre-school activities are in the context of the culture and regional environment in which the child is growing up. The teacher also needs to be capable of administrative and management skills that are required for record keeping, accounting, report-writing so that the institution maintains proper records, and the contact and interaction with the parent community is effective and productive.

It is also extremely helpful for a teacher to be equipped with a good repertoire of skills in the arts. The skills of story-telling, dance, music, voice modulation, of organising playful outdoor and indoor activities are mandatory when working with children. The training courses will offer several such sessions for the trainees but it is also important for a person to be deeply engaged with and willing to interact with children in several different ways.

Young children have a short attention span when compared with older children and adults. Hence, it is not only important to be prepared with several activities, it is also essential to be adaptive and flexible with children, rather than focussed on completing one's own plan of action. A pre-school teacher has often to quickly change her lesson plan, her strategies and techniques to deal with the needs of young children so that s/he can be an effective teacher. For this, good preparation of a large repertoire of activities and skills is essential before entering the career with children.

## Scope

The scope of early childhood care and education is very widespread. A person who is trained as an educator or caregiver for young children can



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either work as teacher in a nursery school, a caregiver in a crèche or as a member of a team of people working for programmes with young children. Additionally, several governmental and non-governmental organisations hire professionals for planning and promoting campaigns or services for young children. A person can also set up his or her own child care and education-related programme as an entrepreneur, which would mean setting up one's own programme, either at home or in a separate space. Such an enterprise would require the expertise related to organisation and management of such institutions over and beyond the training as a child care worker and educator. Depending on your qualification and interest, you can also find a job as coordinator of a programme run by someone else or as a trainer of teachers in the same subject. If you wish to pursue higher studies, you can enrol in a post-graduate diploma or degree in early childhood education and go on to a doctoral degree in the field which will equip you to do further research in the field and also take on other more senior activities as a professional in the field.

Some of the commonly available services in this field are:

- Crèches
- Day care centres
- Nursery schools
- NGOs
- ICDS
- Training institutes

**Careers**

- Teacher in Nursery schools
- Caregiver in day care centres and crèches
- Team members for programmes for young children
- Professionals to plan and promote campaigns or services for young children organised by Governments or NGOs
- Entrepreneur in child related activities: Camps, edu-picnics, activity clubs, preschool education centres
- Higher studies: a post-graduate diploma or degree in early childhood education, later doctoral degrees with research in the field.



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**ACTIVITY 3**

Name the different types of child care services available in your neighbourhood.

## KEY TERMS

ECCE, Child care, Preschool education, Caregiver, Day Care, Crèche

## REVIEW QUESTIONS:

1. What do you understand by the term early childhood care and education?
2. What are the different care arrangements young children may require?
3. What are some of the reasons why young children need a special informal programme before formal schooling?
4. What is meant by a child-centred approach?
5. What is a crèche, and what services does this centre provide?
6. List the skills an ECCE worker must have.
7. Describe how we can prepare for a career in ECCE.

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## Practical 1

**Theme:** **Activities for preschool children**

**Tasks:** 1. Visit to playground or outside open area

2. Collection of play material

**Purpose:** This practical is intended to prepare the student for planning and preparing materials for the activities with young children**.** A specific emphasis is placed on using locally available low-cost or no-cost material.

### Conducting the Practical

1. Divide the class into groups of 5 students each. Together, take a walk around the playground in your school or any open area outside the school.
2. Look around; collect any materials that you think would be clean, safe and appropriate for play with young children. Some suggestions are: rocks, stones, pebbles, flowers, leaves, sticks.
3. Once you have collected the material be sure to clean it properly so that it can be used with children.
4. Each group should prepare one activity for children using any one or more of the following concepts:
   - Colour
   - Number
   - Type of material
   - Texture
   - Shape
   - Size

**Example 1:** Taking leaves of different sizes and shapes, arrange the leaves collected into two sets based on size and shape. Try to identify the plants or trees from which these leaves are taken. Taking two sheets of newspaper, paste the leaves in the two sets. Discuss the names of plants/trees from which the leaves are taken. Other suggestions can be to discuss colour of leaves, matching flowers, names of plants.

**Example 2:** Using the same material, the children (with your guidance) can make a scenery depicting a home, school or forest where some portions can be drawn or painted and some can have materials collected stuck on the paper. The same can also be done on the floor or wall. In case there is any local craft or art that is indigenous to the area in which the children live, care must be taken to link with the folk activity so that children's home environment is also attended to.

**Example 3:** Children can be made to act like birds, animals and insects around the foliage that has been collected. Discussions can take place



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about which animals they have seen that eat foliage. Other characteristics of animals can also be discussed.

These are a few examples: the teacher in a classroom can actually plan many activities around the same play material depending upon what gets the children interested. Story–telling and role play is particularly fascinating for children.

## Practical 2

**Theme: Preparation and use of teaching aids,** using indigenous and locally available material to communicate socially relevant messages for children, adolescents and adults in the community.

Note for the teacher: Several practicals are being suggested based on the objectives stated in this assignment. You may divide your class into four groups so that of the four practicals being proposed, one group of students conducts one practical. At the end they share their materials and experiences.

**Task:** Make a puzzle for young children with indigenous material.

**Purpose:** Providing learning experiences of developing and preparing play material; for example, a puzzle so that young children's development be facilitated.

### Conducting the Practical

1. Instruct the students to bring used boxes made of cardboard (*gatta*)/ old notebook's cover.
2. Students are instructed to draw two single identical pictures of any animal e.g., Fish/elephant or locally available food article e.g., mango, banana.
3. Paint the pictures in bright colours.
4. Stick one picture on the inside of the box/cover of the notebook.
5. The other identical picture should be glued on the other cardboard.
6. After the picture dries, cut it into four pieces.
7. Arrange the pieces on the picture stuck on the cardboard box.
8. The puzzle is ready.
9. Puzzles can also be made out of drawings that are taken from the newspaper or magazines. Cut pictures can also be used to make a

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scrap book with cut pictures and drawings. Some ideas for scrap books are a collection called my family, or my school, or my neighbourhood, village. Pictures of fruits, animals, household objects, natural things, can be used for several activities like these.

## Practical 3

**Theme: Preparation of play materials**

**Task:** Making puppets and masks

**Purpose of the Practical:** The students have to learn how to make play material for children. Young children enjoy playing with masks and also drawing and creating materials themselves. When such an activity is done with 4–6 year old children, they should be involved in the making of the material. Low cost materials have to be used. Usage of masks and puppets promotes language and socio emotional development.

### Conducting the Practical

Collect stiff paper, newspaper, pieces of cloth, thread, leaves and flowers (for colouring the paper). Take a piece of paper and then do as instructed below:-

1. Draw a face on it the size of a 10-year-old child's face. Draw an outline of a mask in the image of a sun, flower or any animal.
2. Draw a small face and join to it pieces of cloth as arms, legs and hair.
3. Using the prepared puppets and masks, tell a story or do a role-play as an interactive activity.
4. Analyse what children can learn through such an activity.

Note for the teacher: Supervise the making of masks with or without children and guide the discussion about learning outcomes.



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CHAPTER

7

# MANAGEMENT OF SUPPORT SERVICES, INSTITUTIONS AND PROGRAMMES FOR CHILDREN, YOUTH AND ELDERLY

## LEARNING OBJECTIVES

After completing this section the learner will be able to:

- explain why services, institutions and programmes are needed for children, youth and elderly
- describe the aspects involved in management of institutions and programmes
- discuss the knowledge base and skills set required to manage and run institutions and programmes
- become aware of the career opportunities available in this field.

## SIGNIFICANCE

Family is the basic unit of the society and one of its chief functions is to look after the needs of its members. The members in a family could include parents, their children of various ages and the grandparents. The composition of the family will vary from one household to another but at



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different stages in its life cycle, the family has different composition and the members together try to meet each others' needs. However, a family cannot always provide all the specialised services that are needed for the optimal growth and development of its members. For example, young children need formal education; all the members need health care. Therefore, each community creates other structures like schools, hospitals, universities, recreation centres, training centres which provide specialised services or support services which can be accessed by different members of the family to meet their needs.

Generally a family, along with other structures of the society like schools, hospitals etc., is expected to meet the needs of its members. However many families in our country are unable to meet even the basic needs of their members and/or access as well as utilise the various services provided by other structures of the society due to various reasons, one of them being lack of resources, especially financial. See the box given below for some pertinent details in this regard. Further, many children, youth and elderly are separated from their families and are left to cope on their own. By themselves, they find it difficult to meet their own needs.

- Poverty in India is widespread, with the nation estimated to have a third of the world's poor.
- According to the Planning Commission of India, in 2011–2012, 29.5 per cent of the population was living below the national poverty line.
- Less than 30 per cent of our population has access to adequate sanitation facilities.
- Less than half of all deliveries in a year are conducted by trained birth attendants, which is a cause of high maternal and infant mortality and morbidity.
- Less than half the country's households consume iodised salt. Lack of iodine adversely affects mental and physical growth of the child.
- Pervasive discrimination against girls and women, which is reflected in a range of adverse indicators, including nutritional and educational outcomes, and the declining ratio of girls to boys, particularly in the youngest age group, are matters of concern.



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For such families, or the members who are in challenging and difficult circumstances, the state/society has to step in and make efforts to look after the needs of its members. This is because it is the responsibility of the government and society to ensure that all citizens have a decent life, and children and youth have opportunities for holistic development in a healthy and stimulating environment. One of the ways in which the government responds to the needs of those who are in difficult circumstances, is by setting up institutions and initiating programmes dedicated to the children, youth and the elderly. It also provides support to the efforts of the private sector and/or the NGO sector. Some of these institutions and programmes may focus on meeting specific needs while some programmes adopt a holistic perspective and provide intervention and services to meet various needs of the individuals together. The latter approach stems from the philosophy that all the needs of the individual must be met together to have optimal impact.

## Basic Concepts

Why are we focussing more on children, youth and elderly? This is because these are 'vulnerable' groups in our society. What do we mean by 'vulnerable'? The word 'vulnerable' refers to those persons / groups in a society, who are more likely to be affected by adverse circumstances and on whom adverse circumstances are likely to have a more harmful impact. What makes children, youth and elderly vulnerable? This can be answered by understanding the needs of these groups. If the needs of any individual are not met in the course of daily life, that person becomes vulnerable.

**Activity 1**

Form three groups in the class and on the basis of what you learned in Class XI, list the needs of (i) Children, (ii) Youth, (iii) Elderly. Try to list (at least 5-8) of the special characteristic needs for each group. A group leader should then present the list of each group to the rest of the class.

## Why are Children Vulnerable?

Children are vulnerable because childhood is a period of rapid development in all domains, and development in one area influences development in all others. In order for the child to grow optimally in all areas, it is important



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that the child's needs for food, shelter, health care, love, nurturance and stimulation be met in a holistic manner. Adverse experiences can have a lasting impact on the child's development.

All children are vulnerable, but some are more vulnerable than others. These are the children who are living in such challenging conditions and difficult circumstances that their basic needs of food, health, care and nurturance are not met and this prevents them from developing their full potential.

Box given below clearly highlights that the needs of a large proportion of child population are not met.

- Nearly two–thirds of children under five years of age suffer from moderate or severe malnutrition. Malnutrition affects development in all areas.
- About 3 million children live on the streets without any shelter.
- Only one in three children of the pre-school age has the opportunity to be in an early learning programme.
- Less than half of India's children between ages 6 and 14 years go to school.
- A little over one-third of all children who enrol in Standard I reach Standard VIII. The others drop out of school for one or the other reason.
- 17 million children in India work, as per official estimates. The actual numbers may be even more. According to the World Bank the number may be 44 million.

All children in difficult circumstances need care and protection but some may violate the law or be involved in anti-social activities. The Juvenile Justice (Care and Protection of Children) Act, 2000 is the first legal framework for juvenile justice in India. The Act concerns itself with two categories of children: those who are "in conflict with law" and those considered to be "in need of care and protection." Children "in conflict with law" (also called juvenile delinquents) are those who have been caught by the police for violating the Indian penal code. In other words, they are arrested by the police because they have committed/ are accused of a crime. The Act provides for a special approach towards the prevention and treatment of juvenile delinquency and provides a framework for the

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protection, treatment and rehabilitation of children. It relates to 'juveniles in conflict with law' and 'children in need of care and protection', by providing for proper care, protection and treatment, by catering to their development needs, and by adopting a child-friendly approach in the adjudication and disposition of matters in the best interest of children and for their ultimate rehabilitation through various institutions. This Act is in compliance with the Child Rights Convention and the identified children in need of care and protection are those:

- who are without any home or settled place or abode or without any means of sustenance. This includes abandoned children, street children, runaway children and missing children;
- who live with a person (guardian or not) who is unfit to exercise control over the child or where there is a chance of the child being killed, abused or neglected by the person;
- who are mentally or physically challenged, ill or suffering from terminal illness or incurable disease and have no one who can support or look after them;
- who are abused, tortured or exploited for purpose of sexual abuse or illegal acts;
- who are vulnerable to being inducted into drug abuse or trafficking;
- who are victims of armed conflict, civil commotion, or natural calamity;
- who are likely to be abused for unconscionable gain. These include abandoned, orphaned, trafficked minors rescued from red-light area, child labourers rescued from factories, lost, runaways, special needs children and children of prisoners.

**Institutions, Programmes and Initiatives for Children**

There are several programmes and services operating in the country to meet the needs of vulnerable children. Here we shall briefly describe some significant initiatives and efforts in order to acquaint you with the various activities carried out by the government and the non-governmental organisations.

- *Integrated Child Development Services (ICDS)* of the Government of India. It is the world's largest early childhood programme which aims to meet the health, nutrition, stimulation and early learning / education needs of children below six years of age in an integrated manner so as to foster their development. The programme offers health, nutrition and hygiene education to mothers, non-formal

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pre-school education to children aged three to six, supplementary feeding for all children below six years and diet for pregnant and nursing mothers, growth monitoring and basic healthcare services such as immunisation and vitamin A supplements. The programme today covers over 41 million children. These services are delivered in an integrated manner at the childcare centre named 'anganwadi'.

- *SOS Children's Villages:* This is an independent non–governmental social organisation which has pioneered a family approach to the long term care of orphaned and abandoned children. SOS villages have the vision of providing family-based, long-term care to children who can no longer grow up with their biological families. In each SOS home there is a 'mother' who looks after 10-15 children. This unit lives like a family and the children experience relationships and love once again, which helps children to recover from traumatic experiences. They grow up in a stable family environment, and are supported individually until they become independent young adults. The SOS families live together, forming a supportive 'village' environment. They are integrated with the local community and contribute to the social life.

In India, the first SOS village was set up in 1964. Now the organisation cares for about 6000 needy/abandoned children in 40 unique villages across the country. Whenever India has experienced unrest or environmental and natural disasters like the toxic gas accident of 1984 in Bhopal, or devastating cyclones, , catastrophic earthquakes as well as Tsunami the SOS Children's Villages rendered immediate assistance with emergency relief programmes, which were converted into permanent facilities, mostly SOS Children's Villages.

- *Children's Homes run by the Government for children from 3–18 years who are in state custody for various reasons.*

There are three kinds of homes for children:

a) Observation Homes where children stay temporarily till the completion of an investigation to track down their parents and collect information on their family background.

b) Special Homes where juveniles (children under 18 years of age) found guilty in terms of violation of law, are placed in custodial care.



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c) Juvenile /Children's Homes where children whose families are not traceable, or are unfit/dead or simply unwilling to take the child back stay. The government is responsible for providing room, board, education, and vocational training. Most of these Homes are run by government in partnership with NGOs. Efforts are made to help the children develop skills which will enable them to become productive members of society.

- *Adoption:* India has a long tradition of child adoption. Earlier adoption was limited within the family and was covered by social and religious practices. But with changing times, adoption beyond the family has been institutionalised and legalised. While the Government of India and State Governments provide necessary support and guidance through policies and programmes, Non-Governmental Organisations (NGOs) provide necessary delivery systems for the process of adoption. In order to strengthen adoption rules and facilitate adoption, the Government of India under the advice of the Supreme Court has constituted a Central Agency, Central Adoption Resource Authority (CARA), to set up guidelines for adoption to safeguard the welfare and rights of children.

## WHY ARE YOUTH VULNERABLE?

The National Youth Policy, 2014 defined 'youth' as persons in the age group of 15–29 years. Those between 13 and 19 years are called adolescents. Our national progress depends, crucially, on the ways and means through which youth are encouraged and nurtured as a positive force for national growth and are enabled to contribute to socio-economic development. Youth is a vulnerable period due to many reasons. During this period an individual is trying to come to terms with many biological changes in her/his body which have an impact on the person's sense of well-being and identity. This is also the period when the individual is preparing to take on adult roles, two of the foremost being earning a livelihood and marriage, followed by raising a family.

Peer pressure and pressure to excel in an increasingly competitive world are other factors that can cause a lot of stress and turmoil. When the family/environment is unable to provide positive support to the

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adolescent, some adolescents may consume alcohol and drugs (also termed substance abuse). Such maladjustive behaviour for combating stress is on the rise. Health is another aspect which is of critical concern. Youth face significant risks related to sexual and reproductive health, and many lack the knowledge and power to make informed sexual and reproductive health choices. Within the broad category 'youth', there are some groups who are especially vulnerable. They are:

- Rural and Tribal Youth;
- Out-of-school Youth;
- Adolescents, particularly female adolescents;
- Youth with disabilities;
- Youth under specially difficult circumstances like victims of trafficking, orphans and street children.

In order to be socially useful and economically productive, youth need appropriate education and training, gainful employment and adequate opportunities for personal development and advancement. They also need requisite shelter and a clean environment, as also basic health services of quality, social defense and protection from all manner of exploitation. Suitable participation in decision-making bodies which are concerned with issues relating to the youth, and with socio-economic and cultural matters, as well as access to sports, physical education, adventure and recreational opportunities are other requisites.

## Youth Programmes in India

The Ministry of Youth Affairs and Sports adopted the National Youth Policy in 2003.

- *The National Service Scheme (NSS)* aims at involving college level students in programmes of social service and national development like construction and repair of roads, school buildings, village ponds, tanks, activities related to environmental and ecological improvement like tree plantation, removal of weeds from lakes, digging pits, activities related to hygiene and sanitation, family welfare, child-care, mass immunisation, vocational training in craft, tailoring, knitting, and organising co-operatives. NSS students also render assistance to local authorities for implementing of various relief and rehabilitation programmes to meet the needs of the economically and socially weaker sections of the community.





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- *The National Service Volunteer Scheme* provides opportunities to students (who have completed their first degree) to involve themselves, on a whole-time basis for a short period of one or two years, in programmes of national development mainly through *Nehru Yuva Kendras*. They are involved in programmes of adult education, establishment of youth clubs, organisation of work camps, youth leadership training programmes, vocational training, promotion of rural sports and games, etc. The Nehru Yuvak Kendras also aim to enable the non-student youth of the rural areas to contribute to development in the rural areas. Through the various activities the Kendras aim to popularise nationally accepted objectives such as self-reliance, secularism, socialism, democracy, national integration and development of scientific temper. Some such activities are non-formal education, social service camps, development of sports activities for young people, cultural and recreational programmes, vocational training, youth leadership training camps and promotion and establishment of youth clubs. These activities are organised for the purpose of helping the non-student youth acquire literacy and numeracy skills for self-reliance, upgrade their functional capabilities, and make them aware of possibilities of their development, thus making the youth functionally efficient, economically productive and socially useful.
- *Promotion of Adventure:* Many youth clubs and voluntary organisations organise activities like mountaineering, trekking, hiking, exploration for collection of data, study of flora and fauna in the mountains, forests, deserts and sea, canoeing, coastal sailing, raft-exhibitions, swimming, cycling, etc., by using the financial assistance provided by the government for promotion of adventure. These activities are aimed at encouraging the spirit of adventure, risk-taking, co-operative team-work, capacity of ready and vital response to challenging situations and endurance among the youth. Government also provides assistance for establishment and development of institutions to facilitate such activities.
- *Scouts and Guides:* The Government provides financial support for training scouts and guides, organising rallies, jamborees, etc. This aims at developing the character of boys and girls to make them good citizens by inculcating in them a spirit of loyalty, patriotism and thoughtfulness for others. It also promotes balanced physical and mental development and inculcates a desire for social service.
- *Commonwealth Youth Programme:* India is participating in the Commonwealth Youth Programme which is aimed at making the youth participate in development processes of their respective countries and



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to provide a forum for increasing co-operation and understanding among the Commonwealth countries. Under this programme, three regional centres for advanced studies in youth work have been set up in India, Zambia and Guyana. The Asia Pacific Regional Centre has been set up at Chandigarh, India.

- *Promotion of National Integration*: Financial assistance is given by the Government to many voluntary agencies to organise visits of youth living in one state to another state with marked cultural differences, in order to promote greater understanding of the historical and cultural heritage of the country, of the problems being faced by the people of different regions and environment, social customs etc. in other parts of the country. Camps, seminars, etc. are also organised with the objective of promoting national integration.

## Why are the Elderly Vulnerable?

In a number of countries, a Senior Citizen is a person in the age group 65 years and above. However, in India Senior Citizens constitute persons in the age group of 60 years and above. There has been a steady rise in the population of older persons in India, since life expectancy, which was approximately 29 years in 1947, has increased to 69.3 years in 2009–13 for females and 65.8 years for males. India is home to the second largest number of Senior Citizens in the world after China. The number of elderly will account for nearly 9 per cent of the population in 2016. (Source: Human Development Report).

The special features of the elderly population in India are:

- Majority (80%) of them are in the rural areas, thus making service delivery a challenge
- Feminisation of the elderly population
- Increase in the number of the older-old (persons above 80 years)
- A large percentage (30%) of the Senior Citizens is below the poverty line.

The elderly are a vulnerable group due to various reasons. Firstly, health is a major concern for many individuals at this age. The elderly are more vulnerable to disease because of decreased physiological reserves and defence mechanisms. Besides illness, the aging process itself leads to certain disabilities such as low vision and blindness resulting from cataracts, deafness resulting from nerve impairment, loss of mobility from arthritis and a general inability to care for oneself.



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Secondly, in the family life cycle for many, this may be a period when they find themselves alone because the children are likely to have moved away from the family either because of marriage or to earn a living. Many may experience feelings of loneliness, isolation and a sense of being a burden on others. Many individuals find themselves financially dependent on the younger generation which may add to their feeling of stress. Further, especially in metropolitan cities, there is fragmentation of the traditional family network and the traditional value system is also undergoing change. Certain features of city life (small family size, nuclear families, lack of free time to care for the aged, limited living space, high cost of living, long working hours), lead to reduced support within the immediate and extended family. Sometimes concepts like privacy, space, independence, materialism, focus on self are also responsible for the inability to adequately care for the elderly. Thus many elderly persons are left to fend for themselves at a time when family support is most necessary for them. Ageing has become a major social challenge and it is necessary to provide for the economic and health needs of the elderly and to create a social milieu which is conducive and sensitive to emotional needs of the elderly.

The above description should not make you think that there are only problem and difficulties in old age. Many old people continue to live fulfilling lives. In many families the elderly are well respected and continue to find fulfillment. One positive feature concerning the elderly population is that most 60 or more years old are economically active, presumably because they are engaged in sectors for which there is no specific age of retirement. What is needed is to recognise the elderly as a human resource and their rich experience and residual capacities be put to optimum use for the benefit of national development. Their ability to lead healthy and fruitful lives should be ensured by the Government. The government adopted the National Policy for Older Persons in 1999.

**ACTIVITY 3**

Divide the class into two groups. Let one group discuss the situation of elderly in their neighbourhood. The other group should discuss how the elderly can contribute to family and society. Let the discussion of each group be presented to the class through a group leader.

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## Some Programmes for the Elderly

Government, Non-Government Organisations, Panchayati Raj Institutions, local bodies are implementing different types of programmes for the elderly in India. Some of the programmes operating in the country for the elderly are as follows:

- Programmes catering to the basic needs of Older Persons particularly food, shelter and health care to the destitute elderly;
- Programmes to build and strengthen intergenerational relationships particularly between children/youth and Older Persons;
- Programmes for encouraging Active and Productive Ageing;
- Programmes for providing Institutional as well as Non Institutional Care/Services to Older Persons;
- Research, Advocacy and Awareness building programmes in the field of Ageing;
- *Old Age homes* to provide food, care and shelter;
- *Respite Care Homes and Continuous Care Homes* for Older Persons who live in old age homes but are seriously ill requiring continuous nursing care and respite;

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- *Multi-Service Centres for Older Persons* to provide daycare, educational and entertainment opportunities, healthcare, companionship;
- *Mobile Medicare Units* to provide medical care to the older persons living in rural and isolated and backward areas;
- *Day Care Centres for Alzheimer's Disease/Dementia Patients* to provide specialised day-care;
- *Help-lines and Counseling Centres for older persons;*
- *Mental health care and Specialised care for the Older Persons* to provide Mental Health Care Intervention Programmes to the elderly;
- *Disability care and hearing aids for older persons;*
- *Physiotherapy clinics for older persons;*
- *Awareness Generation Programmes for Older Persons and Care Givers* like self-care, preventive health care, disease management, preparation for old age/healthy and productive ageing, intergenerational bonding;
- *Training of Caregivers for older persons;*
- *Sensitising programmes for children, particularly in Schools and Colleges;*
- *National Old Age Pension Scheme (NOAPS)* meant for old persons who are considered destitute i.e., not having any regular means of subsistence on their own or through financial support from family members. Beneficiaries should be above 65 years, need to provide proof of age and their destitute status. The state governments can add to the amount from their own resources.

## Preparing for a Career

In this career choice, you may either work as in-charge or manager of certain activities in an already functioning programme/institution, or you may choose to initiate set up of an organisation/programme for the youth, children or the elderly. Whatever be the case, it will be a career for which you will be required to develop a broad knowledge base and multiple skills.

Let us first understand what management of institutions and programmes involves. A career in management of institutions and programmes for children, youth and elderly will need honing of the abilities and skills of a planner, manager and an evaluator, may be even an entrepreneur as well as strong knowledge of the needs, characteristics

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and modes of care giving for the target group would also be necessary. The following are some skills and abilities you will need to develop:

- *People* Skills: Running or working in an organisation means interacting with people in different roles and from different backgrounds. The following are some groups of people you are likely to interact with:

  (i) *The Community:* A programme or an institution for children will be successful if the community feels a sense of involvement and ownership with it. This happens when the programme is planned by involving the people for whom it is intended right from the start. Participatory planning, management and implementation are the pillars of effective programmes. Thus, building linkages with the community and invoking community participation will be a major aspect of your work.

  (ii) *The Private Sector:* The private sector financial institutions, companies and organisations have come in a big way to support innovative programmes and institutions. This is a positive step as it is an opportunity for the private sector to discharge its social responsibilities.

  (iii) *The Officials in the Government:* You may need to interact with government departments for various purposes, including funding and fulfilling other legal requirements.

  (iv) *People within the organisation:* For smooth functioning of the organisation, it is important that the people (both beneficiaries and personnel working therein) enjoy a harmonious relationship with each other. Cultivating cordial interpersonal relations is a major factor in the success of an organisation.

- *Administrative Skills:* Running or managing an organisation or programme involves handling finances, recruiting personnel, renting space, buying equipment, maintaining records and stocks. While there may be other specific people dealing with each of these aspects, it would also be necessary and helpful for you to have a basic understanding of the issues involved in each of these.

Some person may even wish to start and establish a new organisation for some specific needy target group. Such enterprising person will need to consider the aspects of appropriate location, who should it cater to suit the target beneficiaries, the services/combination of services to be provided, finances to run the organisation, recruitment of staff with



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different skills and knowledge base to handle the various aspects of the programme including handling formalities of registering the organisation, implementing the programme, improving the activities based on periodic evaluation and feedback.

Last but not the least, the person needs to have vision about what he/she wants to achieve, how the organisation will contribute to meeting the needs of the target group. A person with a vision is usually deeply committed to that cause and has a strong passion for work in that area.

The need for programmes and institutions for children, youth and elderly which provide quality services will continue to remain a basic need of civil society. The first step in preparation for this career is to develop a knowledge base and an understanding about children, youth and the elderly. Towards this end, it will be appropriate to obtain an undergraduate degree in Home Science (also known by other names such as Family and Community Sciences) or Social Work or any other social sciences. These degree programmes usually focus on such three vulnerable groups in the population. You can chose to enter the employment market after the undergraduate degree or choose to study further. Along with pursuing a programme of study through the conventional system, you can also explore the opportunities provided by the Open and Distance learning in the country to pursue programmes which will equip you to work with the children, youth and elderly. The Indira Gandhi National Open University offers programmes which may be of interest to you. These programmes can be done along with studying for the regular degree course. Some such courses are

– Certificate Programme in NGO Management
– Diploma in Youth Development Work

There are State Open Universities as well which offer programmes through the distance mode. It will be worthwhile to explore the websites of IGNOU and other State Open Universities for more details.

## SCOPE

Depending upon the type of programme you wish to be involved with and your own inclination, the field offers a variety of possibilities. Career avenues are shown in the box.

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## Career Avenues

- Set up your own institution for services to any target group
- Be a manager in an established institution or a programme
- Be a functionary at any level/cadre
- Be a researcher consulting with / assessing /evaluating existing programmes and institutions.

## Key Terms

Children, youth, elderly, vulnerable, difficult and challenging circumstances, people skills, administrative skills.

## Review Questions

1. Why are children, youth and elderly vulnerable?
2. What type of programmes are appropriate for youth?
3. What are some of the concerns with respect to the elderly?
4. Describe two programmes each for children, youth and elderly.
5. What advice will you give to someone who is planning to set up her/his own institution for children/youth/elderly?
6. Describe the knowledge and skills you will need in order to pursue a career in management of institutions and programmes for children/youth/elderly.



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## PRACTICAL 1

**Theme:** **Care and Welfare of the Elderly.**

**Task:** To prepare a script and enact a play about dynamics in a large joint family.

**Purpose:** In families there are people of all ages. A healthy, happy family is one where the needs and requirements of members of every age-group are fulfilled and each member has an important place in the family. Role-play is a powerful technique to communicate these dynamics.

### Conducting the Practical

A group of 5-6 students are selected and assigned roles of different family members: children, parents, grandparents. They are instructed to present a 15-minutes role play for which they have to write a script for the different characters in imaginary situations.

The role-play will be discussed and analysed to evaluate the students' understanding of the role of the elderly and their place in a family.

**Note to the teacher**

After the role-play presentation, the teachers should guide the discussion with reference to the participation of the elderly in family and society, attitude and behaviour of the younger members and the well being of the family.

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## Practical 2

**Theme:** **Making a small booklet** of four line poems on environment, birds and animals, with illustrations.

**Purpose:** Providing the students learning experiences of developing and preparing play material, poem booklet, so that young children's language development could be promoted.

### Conducting the Practical

1. Students in groups of six will be instructed to choose one theme on which they would write one poem.
2. The theme could be environment, birds, animals, water, nature, etc.
3. Students could collect relevant pictures from magazines/newspapers related to their theme. The students may draw and paint the pictures themselves also if they wish to.
4. From one sheet of chart paper cards of 4″ × 6″ could be cut. The students could also use old notebooks covers.
5. Use one card for one poem.
6. With the help of glue, stick the relevant picture to the poem/or draw the relevant picture.
7. Write the poem using bold big letters with coloured pen/wax colours.
8. Complete 4-5 cards in similar manner.
9. Make a cover page, writing the title with pictures.
10. Make holes in the cards and tie these cards with an old string. The booklet of poems is ready.



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## Syllabus

# Human Ecology and Family Sciences
(Classes XI-XII)

## Rationale

The curriculum in Human Ecology and Family Sciences (HEFS), formerly known as Home Science, has been framed keeping in view the principles of the National Curriculum Framework-2005 of the NCERT. Traditionally, the field of Home Science encompasses five areas, namely, Food and Nutrition, Human Development and Family Studies, Fabric and Apparel, Resource Management and Communication and Extension. All these domains have their specific content and focus that contribute to the study of the individual and the family in Indian socio-cultural context. The new curriculum has attempted to break away from the conventional framework of the discipline in significant ways. In the new conceptualisation the boundaries between different areas of the discipline have been dissolved. This has been done to enable students to develop a holistic understanding of life in the home and society. A special effort has been made to communicate respect for every student's life at home and in society by making the curriculum appropriate for both boys and girls, living in different contexts, including those who are homeless. It has also been ensured that all the units address, in their content, the significant principles of equity, equality and inclusiveness. These include gender sensitivity, respect for diversity and plurality in relation to rural-urban-tribal location, caste, class, value for both traditional and modern influences, concern for society and pride in national symbols. Additionally, the novel approach has made concerted efforts, to integrate learning at school by building bridges with other subjects in the sciences and social sciences.

The practicals have an innovative and contemporary character and reflect the utilisation of new technology and applications that would strengthen critical engagement with the lived realities of people. More specifically, there is a deliberate shift to field-based experiential learning. The practicals are designed to foster critical thinking. Further, conscious effort has been made to move away from stereotyped gender roles, thus

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making the experiences more inclusive and meaningful for both boys and girls. It is imperative that the practicals are conducted keeping in mind the resources available with the family and community.

The course adopts a developmental framework in Class XI using the life-span approach, starting with adolescence, the stage of development being experienced by the student. Beginning with one's own stage of development would instill interest and enable identification with the physical and emotional changes that the student is undergoing. Following this is the study of childhood and adulthood. In each unit, the challenges and concerns have been addressed along with the activities and resources necessary to meet these challenges.

For Class XI the 'self and family' and the 'home' are focal points for understanding the dynamics of individual lives and social interaction. The rationale for using this approach is that it will enable the adolescent student to understand herself/himself in the context of the family, which in turn is nested within the wider Indian socio-cultural milieu.

For Class XII, the emphasis is on 'work and careers' through the life-span. In this context, work is perceived as essential human activity that contributes to the development and sustenance of individuals, families and society. Its value is not linked only to its economic ramifications. The student will be helped to explore the significance of work, jobs and careers and their inter relationship. To understand this concept, the student will be imparted life skills and work skills in the respective areas of HEFS. This will facilitate the acquisition of basic skills and orientation to advanced professional skills needed for specialisation in the selected fields discussed in the course. It is significant that these skills will be useful for the student in her/his personal-social life, as well as serve as a springboard for pursuing a career in the future.

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# Objectives

The Human Ecology and Family Sciences (HEFS) curriculum has been framed to enable the learners to:

1. Develop an understanding of the self in relation to family and society.
2. Understand one's role and responsibilities as a productive individual and as a member of one's family, community and society.
3. Integrate learning across diverse domains and form linkages with other academic subjects.
4. Develop sensitivity and undertake a critical analysis of issues and concerns of equity and diversity.
5. Appreciate the discipline of HEFS for professional careers.



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# NOTES

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# Notes



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# CLASS XI

**Theory** **Total Periods 180**

**Introduction:** Evolution of the discipline and its relevance to the quality of life **2**

**Unit I:** Understanding oneself: Adolescence **60**

A. Sense of self-understanding 'Who am I'?

B. Characteristics and needs

C. Influences on identity formation

- Biological and physical changes
- Socio-cultural contexts
- Emotional changes
- Cognitive changes

D. Food, nutrition, health and fitness

E. Management of resources - time, money, energy and space

F. Fabric and apparel

G. Media and communication technology

H. Communication skills

I. Living and working in a global society

**Unit II:** Understanding family, community and society **50**

A. Relationships and interactions with 'significant others';

- Family
- School - peers and educators
- Community
- Society

B. Concerns and needs in diverse contexts: Family, school, community and society

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Key areas:

a. Health, nutrition and hygiene
b. Activity, work and environment
c. Resource availability and management
d. Learning, education and extension
e. Textile heritage of India

**Unit III:** Childhood **30**

Survival, growth and development

Nutrition, health and well being

Care and education

Clothes and apparel

Children with special needs

Socio-cultural influences on children

**Unit IV:** Adulthood **38**

– Health and wellness
– Financial planning and management
– Care and maintenance of fabrics and apparel
– Perspectives in communication
– Individual's responsibilities and rights.



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# PRACTICALS FOR CLASS XI

1. Study of physical self with reference to:
   a. Age, height, weight, hip size, round chest/bust, round waist
   b. Age at menarche: girls
   c. Growth of beard, change in voice: boys
   d. Colour of hair and eyes

2. Understanding oneself with reference to :
   a. Developmental norms
   b. Peers, both male and female
   c. Health status
   d. Garment sizing

3. a. Record own diet for a day
   b. Evaluate qualitatively for adequacy

4. a. Record the fabrics and apparel used in a day
   b. Categorise them according to functionality

5. a. Record one day's activities relating to time use and work
   b. Prepare a time plan for oneself.

6. a. Record own emotions for a day in different contexts
   b Reflect on the "why" of these emotions and ways of handling them

7. List and discuss five messages from print and electronic media which have influenced own self.

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8. Collection of information from different regions in India and critical discussion on:

   a. Food practices including food taboos, fasting and festivity preparations

   b. Clothing practices related to rites, rituals and occupation

   c. Childcare practices in early years – gender similarities and differences

   d. Traditional forms of communication including festive and special occasions

9. List and discuss 4–5 areas of agreement and disagreement with:

   a. Mother

   b. Father

   c. Siblings

   d. Friends

   e. Teacher

   How would you resolve the disagreements to reach a state of harmony and mutual acceptance?

10. Documentation of a traditional textile art/craft of neighbouring area.

11. Visit to any one programme/institution (Govt. /NGO) for children; observation of activities in the programme and report writing.

   Or

   Observation of any two children of different ages in the neighbourhood and reporting on their activities and behaviour.

12. Construction of Quality Of Life (QOL) and Human Development Index (HDI).

13. Relationship of fibre properties to their usage:

   a. Thermal property and flammability

   b. Moisture absorbency and comfort





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14. Study one female adult and one male adult in the age range of 35 to 60 years with reference to:
    a. Health and illness
    b. Physical activity and time management
    c. Diet behaviour
    d. Coping with challenges
    e. Media availability and preferences

15. Calculation of nutritive value of foods to identify rich sources of nutrients.

16. Preparation of different healthy snacks for an adolescent suitable in her/his context.

17. Study of labels on:
    a. Food
    b. Drugs and cosmetics
    c. Fabrics and apparel
    d. Consumer durables

18. Observation and recording of group dynamics in different locations/ situations such as:
    a. Home
    b. Eateries
    c. Playfield
    d. School
    e. Recreation areas

19. Analysis of own communication styles and skills.

20. Plan a budget for self for a given situation/ purpose.

21. List five problems faced by self or family as consumer. Suggest solutions to overcome the same.

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# Class XII

**Theory** **Total Periods 140**

**Unit I:** Work, livelihood and career; Preparation, choices and selection **35**

- Work, age and gender
- Occupational heritage of India
- Career options
- Entrepreneurship and self-employment
- Life skills for career building

**Unit II:** Career Opportunities **5**

Scope of Human Ecology and Family Sciences in higher education and careers

Major concepts, relevance and skills in the following units;

**A. Nutrition, Food Science and Technology** **20**

Specific Careers and Areas

- Clinical nutrition and dietetics
- Public nutrition and health
- Catering and food services management
- Food processing and technology
- Food quality and food safety

**B. Human Development and Family Studies** **20**

Specific Careers and Areas

- Early childhood care and education
- Guidance and counselling
- Special education and support services
- Support services for children in difficult circumstances
- Management of institutions and programmes for children, youth and elderly



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**C. Fabric and Apparel** **20**

Specific Careers and Areas

- Care and maintenance of fabrics in institutions
- Design for fabric and apparel
- Retailing and merchandising
- Production and quality control in garment industry
- Museumology and textile conservation

**D. Resource Management** **20**

Specific Careers and Areas

- Human Resource Management
- Hospitality management
- Designing of interior and exterior space
- Event management
- Consumer services

**E. Communication and Extension** **20**

Specific Careers and Areas

- Management of development programmes
- Development communication and journalism
- Media management and advocacy
- Media design and production
- Corporate communication and public relations

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# Practicals for Class XII



**Specialisations in HEFS**

**Nutrition, Food Science and Technology**

1. Qualitative tests on food adulteration
2. Development and preparation of supplementary foods for nutrition programmes.
3. Planning messages for nutrition, health and life skills using different modes of communication for different focal groups.
4. Preservation of foods using traditional and / or contemporary methods.
5. Packaging and study of shelf life of the prepared products.

**Human Development and Family Studies**

6. Preparation and use of teaching aids, using indigenous and locally available material to communicate socially relevant messages for children, adolescents and adults in the community.
7. Conducting mock sessions among peers in career guidance, nutrition counselling and personal counselling under supervision.

**Fabric and Apparel Science**

8. Preparation of articles using applied textile design techniques: tie and dye/batik/block printing.
9. Application of quality control techniques in garment industry:
    a. Fabric inspection
    b. Quality of seams and notions
    c. Size labels
    d. Packaging
10. Care and maintenance of fabric products:
    a. Mending
    b. Cleaning
    c. Storage

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**Resource Management**

11. Open an account in bank/ post office. Learn basic banking operations (Mock exercises in the lab with real bank forms)
12. Application of traditional/contemporary techniques of home decorations:
    a. Floor and wall decorations
    b. Flower arrangement
    c. Other forms of local decorations

**Extension and Communication**

13. Analysis and discussion of print, radio, and electronic media with reference to: focus, presentation, technology and cost
14. Communicating with groups on any one of the following themes.
    a. Social messages- gender equality, AIDs, female foeticide, child labour, rights abuse and other such themes)
    b. Scientific fact/discovery
    c. Any significant incident/event

**Projects**

Anyone of the following projects may be undertaken and evaluated:

1. a. Analysis of traditional occupations prevalent in one's own local area, their beginnings, present status and challenges faced.
   b. Analysis of gender roles, entrepreneurial opportunities, and future careers and family participation.
2. Documentation of any public/mass campaign being implemented in own area, with reference to:
   a. Purpose of campaign
   b. Focal group
   c. Modalities of implementation
   d. Stakeholders involved
   e. Media and methods used
   f. Comment on the relevance of the campaign.

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3. Study of an integrated community-based programme being implemented in own area, with reference to:
    a. Programme objectives
    b. Focal group
    c. Modalities of implementation
    d. Stakeholders involved
4. Visit to the neighbouring areas and interviews with two adolescents and two adults regarding their perception of persons with special needs.
5. Profile any one person with special needs, child or adult: to find out their diet, clothing, activities, physical and psychological needs.
6. Observe and document any event in your school/ home or neighbourhood. Evaluate the same with respect to:
    a. Its relevance
    b. Resource availability and mobilisation
    c. Planning and execution of the event
    d. Financial Implications
    e. Feedback from stakeholders
    f. Suggest modifications for the future.



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# Feedback Questionnaire
## (Human Ecology and Family Sciences Textbook)

Please give your comments on the textbook by filling this feedback questionnaire. You may please send the questionnaire by post, or through email, to Dr. Tannu Malik, *Assistant Professor,* Department of Education in Social Sciences, NCERT, Sri Aurobindo Marg, New Delhi-110016. Email: tannu_malik@rediffmail.com

We welcome feedback from teachers, students, parents and any other user of the textbook. *You may attach a separate sheet as per your requirement.*

Teacher/Student/Parent/Any other (please specify)

Name_____

School address _____

_____

1a. Is the cover page and printing of the textbook attractive? Yes/No

1b. If not, please specify

_____

1c. Do you find the language simple and easy to understand? Yes/No

1d. Mention the chapters/pages where the language is difficult to understand.

| Chapter No | Page No. | Lines |
|---|---|---|
| _____ | _____ | _____ |
| _____ | _____ | _____ |

2a. Do you find the content of the textbook adequate to meet the requirements of the syllabus? Yes/No

2b. Mention the chapters which are lengthy.

_____

2c. Mention the chapters which are too sketchy.

_____

3a. Does the textbook explain the scope and significance of each domain of HEFS?

Yes/No

3b. If no, please specify.

_____

4a. Certain practical and activities have been suggested in the textbook. Which of them have you undertaken in your class? Mention those which you found useful, engaging and enriching.

_____

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4b. Mention difficulties, if any, faced while organising/doing these practical/ activities.

_____

5a. Do you find the illustrations helpful in understanding the content? Yes/No

5b. Mention the illustrations which are not helpful in understanding the content.

| Chapter No. | Page No. | Figure No. |
|---|---|---|
| _____ | _____ | _____ |
| _____ | _____ | _____ |

6. Mention the printing errors, if any.

| Chapter No. | Page No. | Line |
|---|---|---|
| _____ | _____ | _____ |

7. Any specific comments/suggestions for overall improvement of the textbook.

_____

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# Notes

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